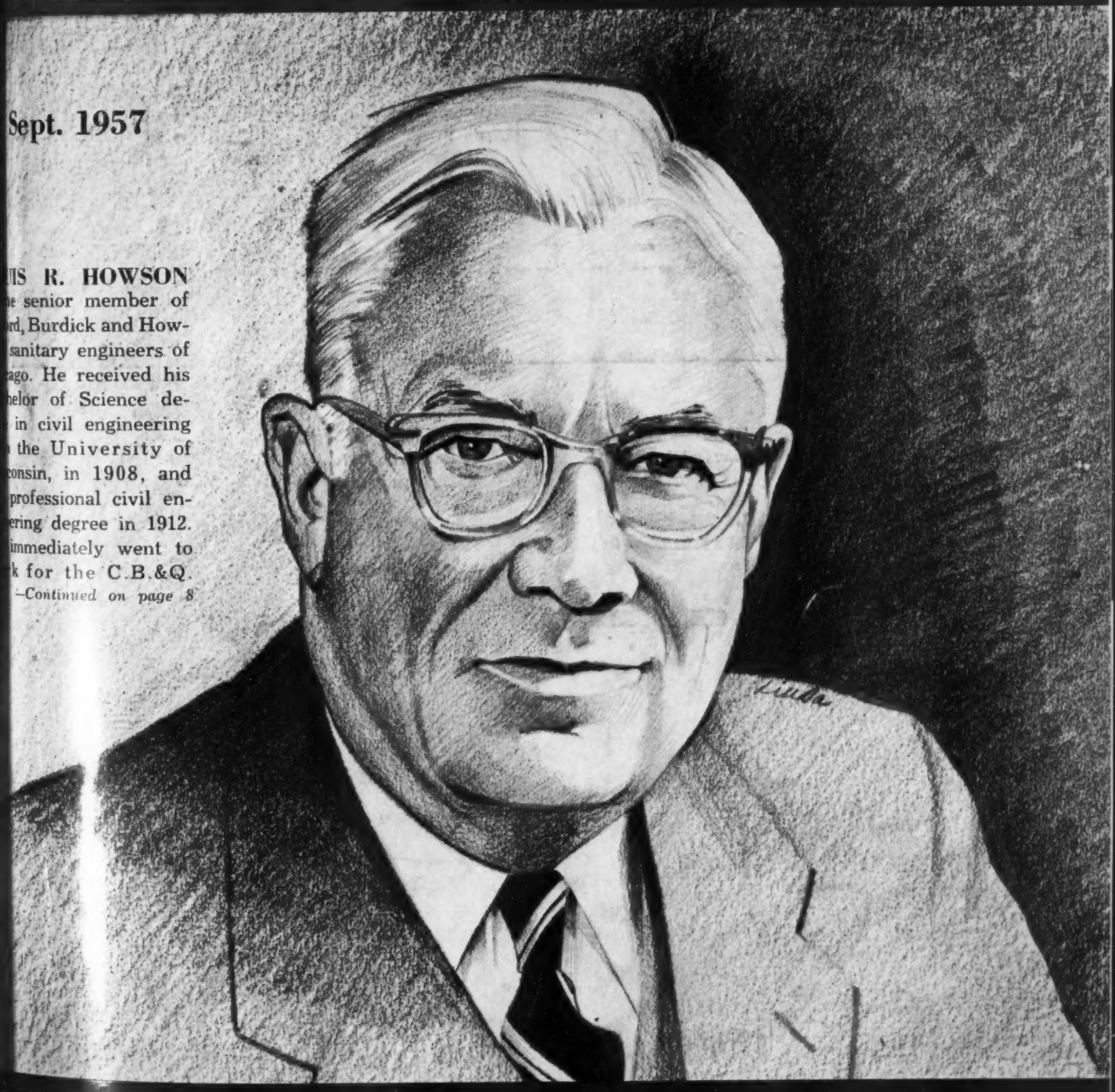
Consulting Engineer

Sept. 1957



IS R. HOWSON
e senior member of
rd, Burdick and How-
sanitary engineers of
ago. He received his
helor of Science de-
in civil engineering
the University of
consin, in 1908, and
professional civil en-
ering degree in 1912.
immediately went to
k for the C.B.&Q.
—Continued on page 8

The Consulting Engineer's Professional Magazine

...more quality proved POWELL VALVES

FIG. 2309—Flush Bottom Tank Valve for 150 Pounds W.P.

FIG. 2491—Stainless Steel O.S.& Y. Gate Valve for 150 Pounds W.P.

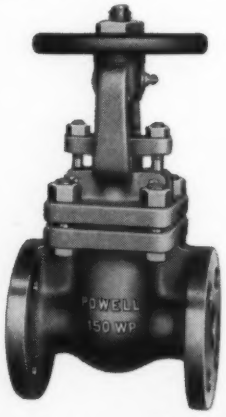
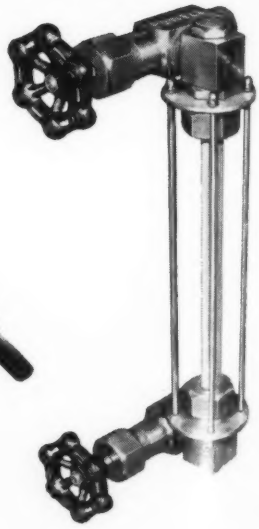


FIG. 1886—Stainless Steel Liquid Level Gauge for 350 Pounds W.W.P. Offset pattern.

FIG. 2107—Stainless Steel "Y" Valve for 150 Pounds W.P.



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Consulting Engineer

The Consulting Engineer's Professional Magazine

September, 1957 · VOLUME IX · NUMBER IX

82 Errors and Omissions
Staff Report

ARTICLES

84 Designing Drive-In Facilities
Robert G. Dyment

89 Air-Conditioning Large Monumental Buildings

102 Techniques in Specifying Steam Traps
William J. Fadden, Jr. and John W. Welker

108 Entertainment, Travel, and Your Income Tax
Carl H. Ristau

114 We Can Guide Urban Growth
Arthur W. Consoer

118 Report From England
F. C. Livingstone

Cover Personality — Louis R. Howson

DEPARTMENTS

16 Readers' Comment
26 Scraps and Shavings
30 The Word from Washington
34 Readers' Guide
40 Heard Around Headquarters
52 Legal Aspect
62 Report From the West Coast
72 Atoms in Action
128 Report From the East Coast
140 Beyond Our Borders
154 News for the Consultant
176 Men in Engineering
182 New Projects Reported
196 Books
202 Meetings
204 Advertiser's Index

The Engineering Index Service in Public Libraries lists articles from Consulting Engineer

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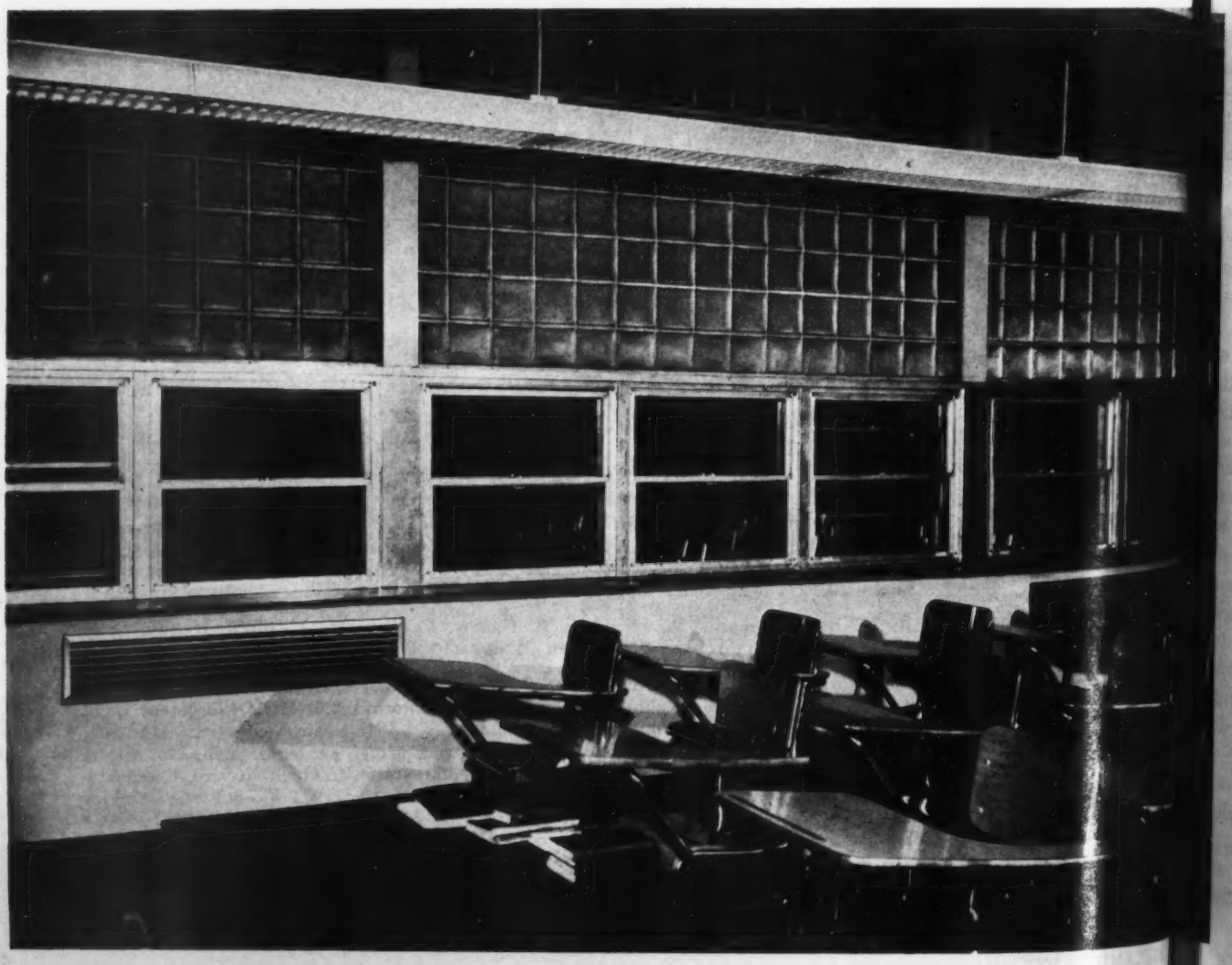
How high velocity provides maximum comfort for schools

The *Anemostat All-Air High Velocity* system of draftless air distribution offers many important advantages for heating and ventilating schools. • High velocity units, used with smaller than conventional ducts, save space and money. They substantially reduce sheet metal required, can be installed faster, at less cost. Since there are no coils in All-Air HV units, clogging and odors are eliminated. • Anemostat *All-Air HV* operate entirely with air processed in the main equipment room; there is, therefore, no need to break through the walls of the building for prime air make-up. The Anemostat *All-Air HV* units eliminate fans, filters, and electric motors in the school rooms. Units are quiet, need a minimum of maintenance from custodians. • On these pages are typical installations in which the *Anemostat All-Air High Velocity* system has been used successfully. Application data on your specific school heating, ventilating or air conditioning problem is available from Anemostat representatives or from the home office.

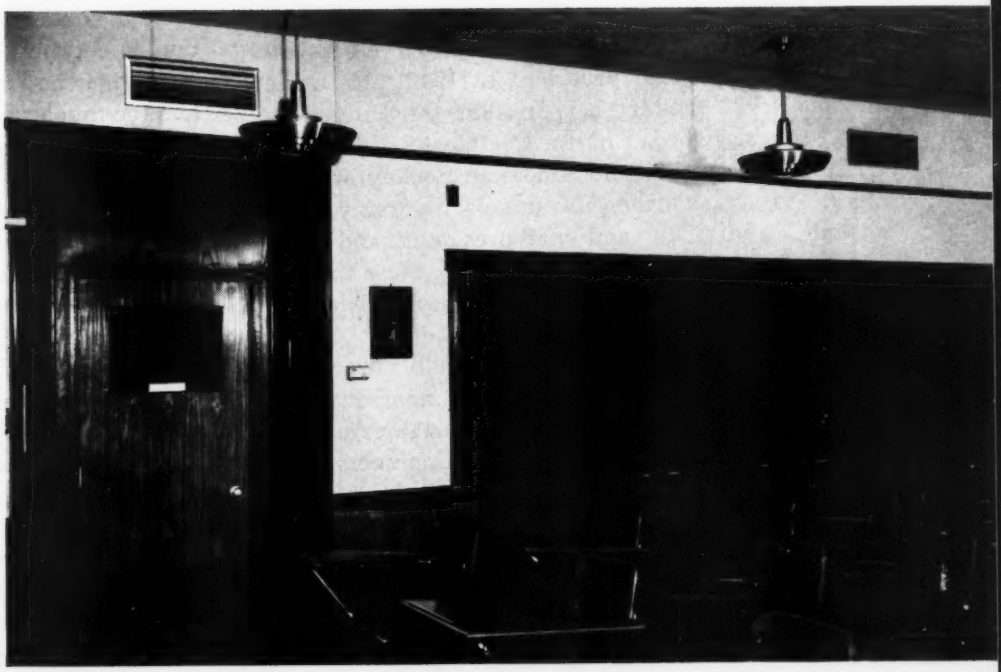
Consulting Engineers — attention please:

Anemostat round, square and straight line diffusers with high velocity units are adaptable to a wide variety of architectural designs.



In this schoolroom Anemostat Type E Square Air Diffusers are installed in the ceiling.

Here Anemostat SLW Straightline Air Diffusers on the high sidewall provide draftless comfort.



Note the Anemostat UTW Straightline Air Diffuser located under the window in this classroom.

Anemostat UTW Straightline Air Diffusers are placed under the windows in this school laboratory.

Write on your business letterhead for your copy of

New Anemostat Selection Manual 60

to Anemostat Corporation of America, 10 East 39th Street, New York 16, N. Y.

ANEMOSTAT: The Pioneer of All-Air High Velocity Systems

Louis R. Howson

—Starts on front cover

Railroad. After just a few months with the railroad, he learned that water supply and sewerage systems were being built for the proposed steel city of Gary, and the next day he was in the office of Mr. Alvord, the consulting engineer in charge of the project.

"We will not give you any financial incentive to join us," Mr. Alvord told him, "but if you are really interested in sanitary engineering on a long term basis, give the railroad two weeks notice and come to work. We will pay you less than they do."

Louis Howson took the job, and less than nine years later he was taken into the firm. Not only did he like sanitary engineering, but he has had a great deal to contribute to it. His contributions have been recognized by the American Water Works Association which has presented him with the Fuller, the Diven, the Goodell and Management Division Awards, elected him president in 1942, and made him an Honorary Member. In 1951 the University of Wisconsin awarded him a Certificate of Merit.

He has also served the American Society of Civil Engineers as chairman of many important committees, as director and vice-president, and as a member of the Executive Committee. Now the Society has nominated him for the office of National President, his term to begin in October.

While he has been most active in his work for ASCE and AWWA, Howson is also a member of the American Society of Mechanical Engineers, The American Institute of Consulting Engineers, The Western Society of Engineers (of which he is a past president), The American Public Health Association, and the Illinois Society of Professional Engineers. The list of cities for which he has designed water supply and sewage systems looks like the index to an atlas, and he has been registered as an engineer in 30 states and 4 Canadian provinces.

Beyond all this he is a gentleman, a diplomat, and a man of wisdom. In an exclusive interview with CONSULTING ENGINEER in Chicago, this month, Louis R. Howson, about to assume the presidency of this country's oldest engineering society, had this to say:

Question: Mr. Howson, there has been much talk concerning a plan for true unification of the profession under EJC; what is going to happen?

Answer: First let me say that I believe EJC offers the best promise of a unified engineering profession that has been considered to date. EJC now embraces in its various classifications of Membership, some fifteen societies having an aggregate membership of about 300,000 engineers. Of the major engineering societies, only the NSPE remains outside of EJC.

There have been several proposals that were designed to bring the National Society of Professional Engineers and the Engineers Joint Council groups together. One recent suggestion which contemplates assigning particular aspects of society work to several organizations is, I think, a step in the opposite direction. Under this plan, the Founder Societies would confine their activities to technical aspects, Engineers Council for Professional Development would deal largely with engineering education, and NSPE would be principally professional in approach.

It appears to me that first EJC and NSPE must get together. To attempt now to assign particular fields of activity to each of the societies is to assume that they can get together — and that is too great an assumption at the moment. Personally, I think it will come. Probably NSPE and the Founder Societies are closer together now than they ever were, but there are still many problems of both personal and policy nature. There are some influential members of each group whose opinions no amount of argument is likely to change. It is a matter of time.

As to the assignment of particular fields of operation to certain societies or groups of societies, I am afraid it is not that simple. Perhaps I see this problem too much from the point of view of the engineer in private practice, but I feel that such an arrangement as has been proposed would not handle the special problems of the consultant. For example, the only engineering society that acts regularly to maintain enforcement of ethical standards is the American Society of Civil Engineers. If the ASCE is restricted to purely technical activities — publication of papers and the promulgation of technical codes and specifications — who is going to enforce those parts of our Code of Ethics that have to do with private practice? NSPE to date has taken no disciplinary action although that is in the scope of activities which some would allot wholly to that society. How can one society such as NSPE which thus far has not disciplined its own members for ethical infractions be expected to take over that responsibility for the entire profession?

Here is the point. NSPE subscribes to Canons of Ethics for Engineers — a code that applies broadly to all engineers whether with industry, government, or in private practice. ASCE and all the other Founder Societies also subscribe to the Canons. But ASCE, perhaps because it embraces a higher percentage of engineers in private practice than the other societies, feels that while the Canons are good, they do not go far enough. We added to them our own Code of Ethics, composed of ten points, each of which has to do directly with ethics related to private practice — such matters as competitive bidding, commission agents, self-laudatory advertising, competition with other engineers. The Canons do not even touch on some of these.

How, under present conditions, could NSPE deal with the use of commission agents, for example, when the Canons do not even mention them?

For reasons of this type, I think that ASCE, or any other society, cannot give up its work in the

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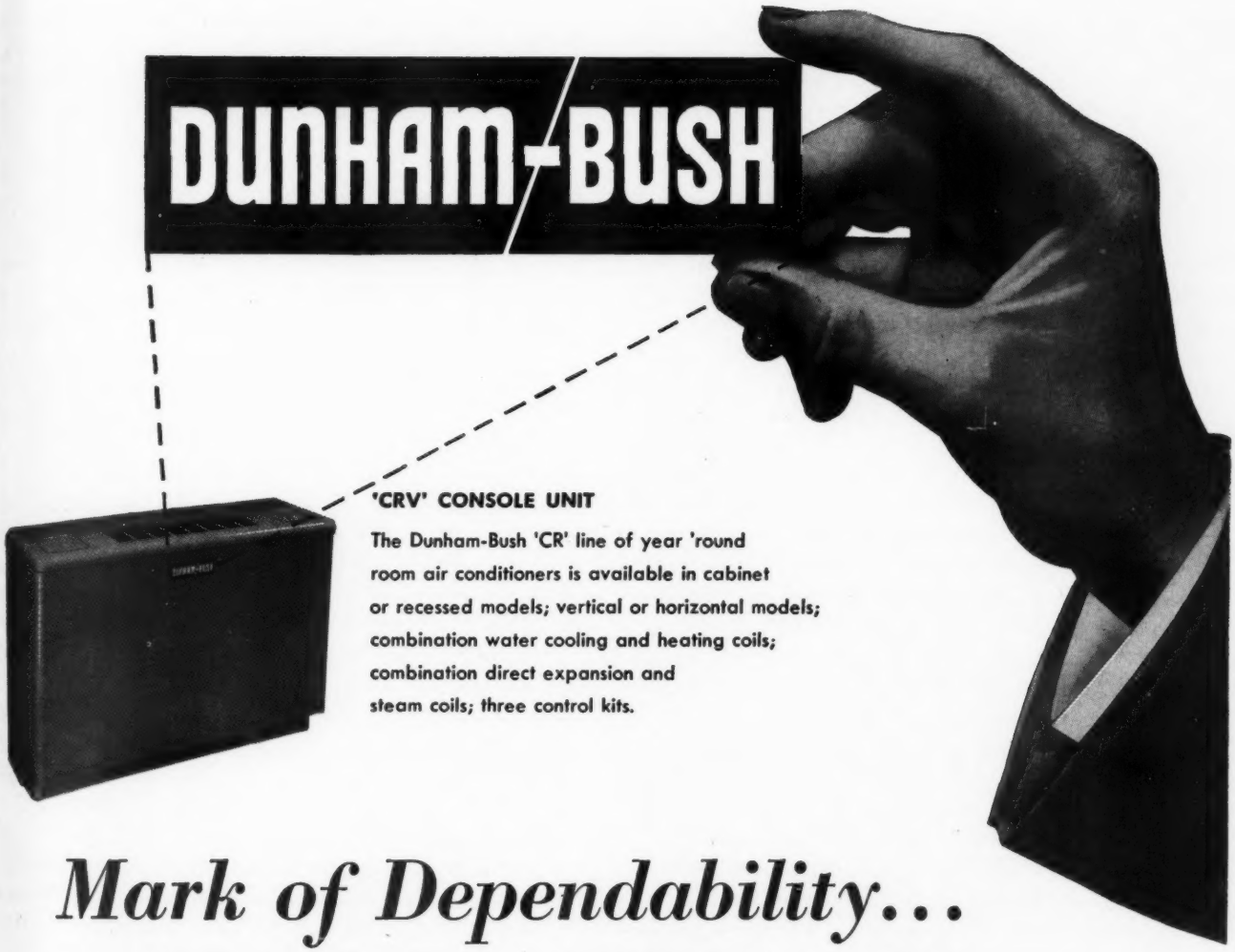

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field of professional ethics, at least until it can be sure that something better will fill the void.

Q. How can a society with only 20% of its members in private practice handle the problems of all consulting engineers?

A. I did not say that ASCE can do that, and I do not think it should. There are obvious difficulties. ASCE deals only with civil engineers, and there also are mechanical, electrical, chemical, and mining engineers in private practice, all of whom face the peculiar problems of private practitioners. ASCE cannot either assist or regulate them directly or indirectly except by its work in EJC, which now has in progress the preparation of a Manual of professional practice for all branches of engineering. This I believe is further evidence of growing unity.

Q. Can the problems of private practice be handled by an organization entirely of consulting engineers?

A. Yes, in theory that would be logical. But again there is no such organization at present. There is the American Institute of Consulting Engineers. I am proud to be a member of that Institute. It has among its members some of the most distinguished engineers in the country, but it certainly is not set up to police the ethics of all engineers in private practice. There are only some 260 members of the Institute. They could hardly deal with the thousands of consulting engineers who are not members.

The state associations of consulting engineers and the Consulting Engineers' Council also are limited in membership, and they are not old enough yet for anyone to say just what they can do. Meanwhile, ASCE should not relax interest in the problems of its consulting engineer members.

Q. What do you have in mind as the principal objective for your term of office as president of ASCE?

A. I am interested in increasing the participation of the members in the society's work, which will automatically increase its value to them. One way to do this would be by increasing the attendance at national meetings — we hold three a year — and that means making the programs at these meetings more attractive and valuable to those who attend. I believe that when only 3 or 4 percent of the membership attend even the annual meeting in New York, it is an indication of some weakness in present procedures. Some societies serve but a single segment of the profession and have the advantage of offering programs in a specialized field, and the men practicing in that field know that they cannot afford to miss the large number of important papers that are presented relating to their field of interest. The percentages of members attending and participating in such meetings is accordingly high.

ASCE, on the other hand, has 14 different divisions — designed to cover the entire field of civil engineering. It is impossible to put on a program that will deal entirely with topics of interest to all the different branches of civil engineering. But we can do better than we have been doing.

A study has been made that shows that any division that has only one session (two or three papers) at a meeting attracts low attendance. If the division schedules two sessions, the attendance per session nearly doubles, and with three or more sessions scheduled, the attendance increases even more. In other words, it takes more than two or three papers in a field to get men to come from any distance. We should carry more sessions from fewer divisions at one meeting. Program time instead of being spread among 14 divisions, each having 2 to 6 papers, should be allocated among 5 or 6 divisions, each having six to twelve papers at a meeting. I believe that in that way the programs would be made worthwhile for more people.

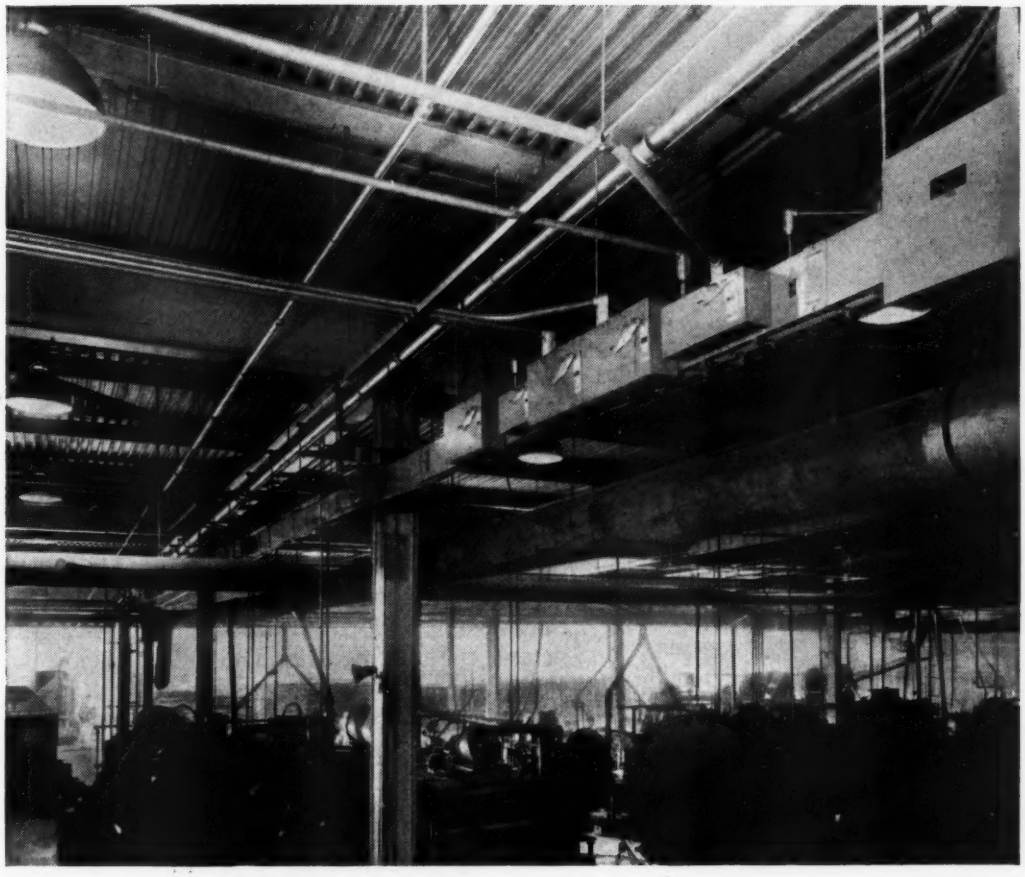
Q. What is the trend in private practice?

A. I believe there will be continued growth in private practice of engineering. Consulting engineers develop specialists and operate with a higher load factor than is possible when owners attempt to assemble engineering forces for specific projects. We are primarily sanitary engineers and as such deal largely with municipalities and government agencies. We move rapidly from one project to another. Our top men have worked together for better than 20 years. Under these conditions we are able to step in and do a project quickly and efficiently.

Municipalities, industries, and other clients and potential clients of consulting engineers are learning that we offer a service and background of experience difficult to acquire otherwise. In addition, public bodies are now frequently unable to hire the needed men on their own payrolls, so they turn to the consulting engineer through necessity. But whether it is through choice or otherwise, the fact is that the work for engineers in private practice is rapidly increasing and so long as consulting engineering services are of superior character I believe the number of engineers with their own businesses will continue to grow.

Specifically, I think that there is going to be more and more work for consulting engineering firms of all types and sizes, but I believe the soundest and most consistent growth will be for firms of medium size. In such a firm a small group of partners can keep in close touch with all projects through personal supervision and develop a satisfactory volume of work in special lines.

The professional aspects and the challenging opportunities and problems of private practice have always appealed to me. While the man who goes into it must above all be a good engineer, he owes it to both his clients and to his organization to give proper consideration to the business side of operating a consulting office. He must know what he is doing and why. As Mr. Alvord used to say, "Private practice is like a snowball. If it is well put together and sound, it will keep getting bigger and bigger as it rolls, but if there is a soft spot, it will fly apart before you can stop it." ▲▲



Section of Life-Line Uni-Bus showing interlocked plug-in safety slide.

This installation shows Westinghouse plug-in duct used as a branch circuit supplying power to several machines. Easily changed take-off devices allow the relocation of any machine without power shut down to the others.

For complete information on Westinghouse Bus Duct or Uni-Bus, write for New Bus Duct Manual B-4272-C.

YOU CAN BE SURE... IF IT'S Westinghouse

VENTILATED HIGH BAY

The industrial plant pictured here is lighted right for efficiency, safety and economy with Westinghouse equipment similar to the high-bay fixture at left. Self-cooling, rugged, easy to keep clean. It lights right and lasts long.

LOCKLITE: This sturdy incandescent fixture has a wide variety of industrial applications. Exclusive Locklite feature simplifies cleaning of replacing lamps. Wide reflector gives effective light distribution.

Ask your local Westinghouse representative for descriptive bulletins relating to the types of lighting that fit your needs.

DP-5036-E

Readers' Comment

CE's Hard to Find

Sir:

My friend, Harold Timmons, and I recently graduated from the University of Nevada in mechanical and electrical engineering, respectively. We had hopes before graduation of entering the consulting field in a well established consulting firm.

We found it exceedingly difficult to obtain information concerning consulting firms and after a fruitless attempt we decided to seek employment in other engineering fields.

Our ambitions are still for consulting careers and we are endeavoring to acquire positions in the same firm. Any information that you might be able to forward us concerning consulting firms in the west that deal primarily in the electrical and mechanical designs of commercial structures would greatly be appreciated.

Thank you for your time and consideration.

Charles H. Handley
Sparks, Nev.

The Manufacturers Speak

Sir:

We have just received your July 1957 issue and were particularly interested in the article "How to Write Engineering Specifications." It appears that you have a somewhat misleading concept of what manufacturers call a good specification when you say, "So far as manufacturers are concerned, the only good specifications are those naming their product."

It should hardly be necessary to point out the benefit to industry of competitive bidding and good engineering specifications. You certainly must recognize that most industries rely on a competent engineering staff not only to design their equipment but also to prepare bids. In many cases it is this engineering staff which provides the technical information and detail for the consulting engineer to use in preparing the specifications, and in many cases the specifications are actually prepared by the manufacturer's engineers. While many times it is necessary for the consulting engineers to revise and open up these specifications, there are undoubtedly just as many times that they are carefully written by the manufacturer to provide good competitive bidding.

It is disturbing to think that the Committee of One-Hundred and CONSULTING ENGINEER, which presumably represent consulting engineers' thinking, have such a low opinion of manufacturers and their engineers from whom they receive much of their basic information regarding equipment.

We would suggest that, so far as manufacturers are concerned, the good specifications are those permitting the presentation of a fair competitive bid which will result in an equitable contract to either themselves or one of their competitors.

It is to this end that organizations like the National Electrical Manufacturers Association draft suggested general specifications for different types of equipment and manufacturers provide equipment data and engineering guidance without charge to both consulting engineers and our mutual customers.

H. A. Mayo, Jr., P.E.
Sales Engineer
S. Morgan Smith Co.
York, Pa.

• WE HAVE A HIGH OPINION OF MOST MANUFACTURERS AND THEIR ENGINEERS, BUT WE HAVE A LOW OPINION OF CONSULTING ENGINEERS WHO LET MANUFACTURERS WRITE THEIR SPECIFICATIONS FOR THEM.

Sir:

. . . All of us in engineering sales work frequently have the urge to criticize specifications, but we seldom have the courage to bring our thoughts to the attention of the only people who can do anything about them. Perhaps you can help.

There are several practices which should be avoided by any consulting engineer who expects to achieve the sort of professional recognition that has been accorded to doctors and lawyers. All of these practices are very prevalent, and I have seen specifications involving some of them within the past few days. I have in mind . . . :

¶ Use of the statement "So-and-so will not be accepted." In most cases, this has been inserted by a salesman and is intended only to eliminate competition. This may be justified if the engineer fully undertands its implications and intends to stand by the statement.

¶ The use of extremely restrictive specifications with no intention of sticking to them. This leaves suppliers and contractors wondering just what they can get away with, and in a few almost farcical instances the supplier whose specifications have been used refuses even to bid.

¶ Completely meaningless specifications. By this I mean specifications which contain obvious anomalies such as naming two or more different types of equipment which are not intended to do the same job but which the engineer seems to regard as competitive and equal. I have such a specification on my desk at the moment, written by a leading engineering firm, which says that it will accept either of the two different types of equipment.

¶ No competent specification

in one of first land-based ATOMIC POWER PLANTS

LimiTorque will operate special 18″ Flow Control Valves

Shown above is the prototype of the special 18″ Main Coolant Valves used at the Shippingport, Pennsylvania Plant of the Duquesne Power & Light Co. There are eight similar Crane Stainless Steel Parallel disc Gate Valves used on the Coolant lines in a pressurized water reactor system; and several will be opened and closed electrically by LIMITORQUE "push-button" Valve Operators. These valves are designed to seat and back-seat at pre-determined fixed loading. Special dial indicators are provided for continuous observation of seat-loading.

. . . Many other critical valves in this plant will be operated by standard Limitorque Valve Controls.

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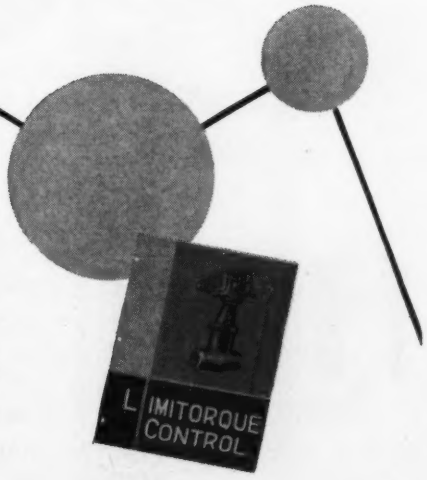

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should permit a contractor to bid on the basis of one set of prices and then shop for cheaper equipment after getting the job unless the contractor is required to give the customer the benefit of any saving. This is one of the most objectionable and most prevalent of all malpractices. It can work to the advantage of no one but the contractor. The engineer has completely evaded his responsibility when he permits this.

One other complaint that we occasionally have is that consulting engineers try to prevent us from discussing a job with their client. If the client is willing to talk to us, then the engineer should have no objection. Certainly we would not butt in if the client did not want to discuss the job with us.

I would like to take exception to one statement and that is that manufacturers do not like any specification unless it names their product. Actually, when we see a specification that is properly written and that protects the purchaser against inferior equipment or improper design, we are glad to bid competitively. What we do not like to see is a specification that will permit the substitution of equipment that is sure to be unsatisfactory.

A. W. Michalson
Sales Manager
Illinois Water Treatment Co.
Rockford, Ill.

Errata

Sir:

On page 152 of a recent issue of CONSULTING ENGINEER magazine (July 1957) it stated that Russell and Axon, Engineers, of St. Louis, Missouri, have three projects located in Northbrook, Illinois. A railroad bridge in the amount of $75,000, paving projects in the amount of $200,000, and storm sewer projects amounting to $150,000, and it lists Northbrook, Illinois, as the client.

These statements are in error in that Russell and Axon have never been employed by this village. I do not know the source of this information, nor how this error was made, but since it has been brought to my attention by readers of your magazine, I would like a retraction of this statement in the next issue of your magazine.

Troy L. Miller
Village Manager
Northbrook, Ill.

• ENGINEERS ON THESE PROJECTS SHOULD HAVE BEEN LISTED AS SUHR, PETERSON, PETERSON & SUHR, INC., CHICAGO, ILL.

Timely and Interesting

Sir:

Thank you for your recent letter informing me that I will henceforth receive copies of CONSULTING ENGINEER regularly beginning with the August issue. I sincerely appreciate the privilege of being put on your mailing list, because I find your magazine contains articles on many timely and interesting subjects.

As a matter of fact, in reading the copy which is circulated in our office I have run across several excellent articles which I would like to have for my technical file. Specifically, I wonder whether it

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THE **DURIRON** COMPANY, INC./DAYTON, OHIO

ANODE DATA SHEET

Number 3

Fresh Water

Basic engineering information about DURIRON *impressed current anodes for cathodic protection.*

Protection of an Office Building Water Service Tank

THE PROBLEM: The cathodic protection of two 2600 gallon office building water service tanks. Aluminum anodes previously used in the installation had a comparatively short service life and required annual replacement. The continually increasing surface resistance of the aluminum anodes also required periodic rectifier adjustments to maintain an adequate protective current.

THE INSTALLATION: The tank is a single structure divided by a bulkhead to form two separate water storage units of identical size. The anodes were laid out to miss internal bracing, floats, and free-space for hatch opening. A single Duriron Type D (2" x 60") anode was first tested in parallel to fifteen 5 month old aluminum anodes (1-1/16" x 72") to determine its relative merits. Although the Duriron anode had slightly higher surface resistance when first installed, it showed no tendency for this surface resistance to increase and within 2 to 3 months was passing over twice as much current as the average current from the aluminum anodes.

After 311 days of the testing period the original anode proved so successful that all fifteen aluminum anodes (having reached the end of their useful life) were replaced with Duriron Type A (1" dia. x 60" long) anodes. One and one-half standard lengths were joined end to end making each anode assembly 7.5 feet long. Fifteen assemblies, together with the original test anode, were installed as shown in Fig. 2.

The test anode was inspected after more than two years of operation with the following results:

Total energy discharge—8700 ampere hours
Weight loss—3 ounces
Rate of loss—0.19 lbs. per ampere per year
Current density, over a 10 month period—0.14 to 0.21 amps per square foot

THE PERFORMANCE TO DATE: Five of the fifteen Duriron anodes installed on a permanent basis were inspected after 440 days of operation. The following table illustrates the results of this inspection.

Inspection Results After 440 Days Service

Anode Number	Total Energy Discharge (Ampere Hrs.)	Weight Loss (Ounces)	Consumption Rate Lbs./Amp./Yr.	Current Density (Amps per Square Foot)
1	3400	1	0.160	0.21 to 0.28
2	3181	½	0.086	0.20 to 0.27
3	3600	2	0.300	0.22 to 0.30
4	3000	¼	0.045	0.17 to 0.23
5	3400	1½	0.240	0.22 to 0.30

Incidental Data at Inspection Time:

A—Water resistivity in this tank was approximately 14,000 ohm-cm.

B—Average potential impressed on anodes was 25 volts, d-c.

A careful inspection was also made of the submerged joints of the five anodes. While a single neoprene washer appeared to adequately protect the submerged joint, polyethylene or polyvinylchloride tapes were also used over the joints to give further protection. All joints were found to be in excellent condition, although it was concluded that the taping of joints afforded little, if any, extra protection. There was no evidence of attack on the Monel inserts or the Everdur studs.

Corrosion attack on Duriron impressed current anodes is negligible at low current densities under the conditions of this installation. The Duriron anodes showed no appreciable increase in surface resistance during the entire period.

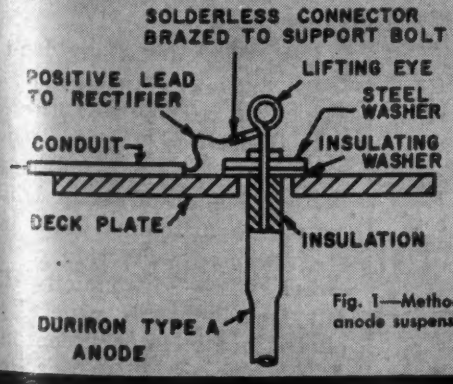

Fig. 1—Method of anode suspension

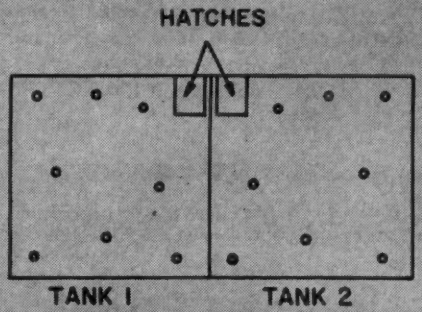

Fig. 2—Illustration of anode spacing

If you would like to receive these data sheets regularly

MAIL THIS COUPON } The Duriron Co., Inc. Dayton, Ohio

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No Pennsylvania Association

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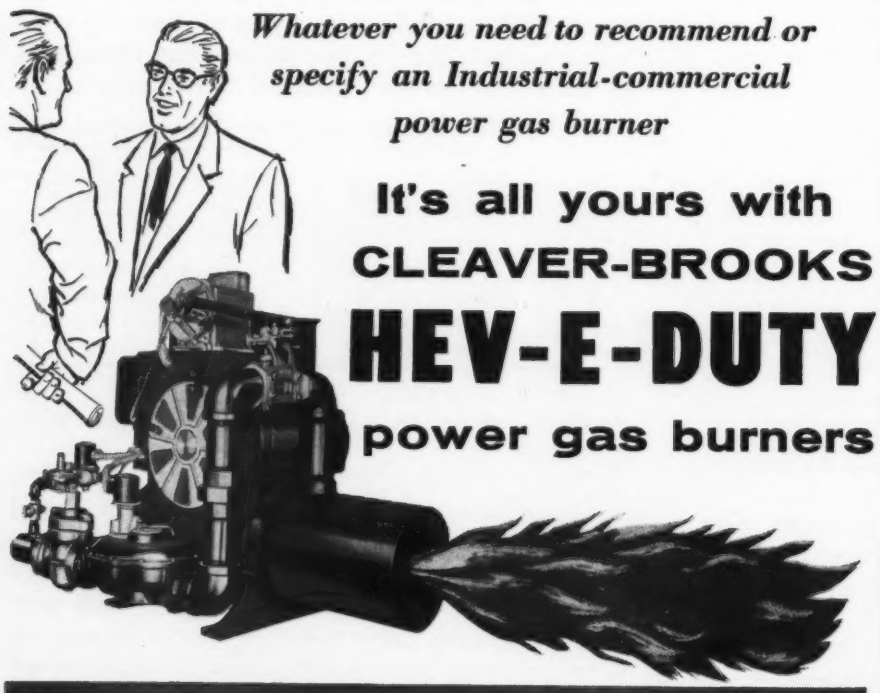
Will you advise me if there is a consulting engineers association in Pennsylvania? And if so, where is their headquarters located? Would also appreciate your submitting the address of the National office.

J. L. Medlar, P.E.
Reading, Pa.

• AS FAR AS WE KNOW, THERE IS NO CONSULTING ENGINEERS ASSOCIATION IN PENNSYLVANIA.



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Electronic Sound Systems

SIR:

A brief note to tell you that we enjoyed the article on "The Design and Specification of Electronic Sound Systems" in the current (July) issue of CONSULTING ENGINEER. Professionally written material of this calibre appearing in the industrial magazines of the country certainly will give industry a greater awareness of the effectiveness of sound as a business, industrial, and entertainment medium . . .

Lawrence LeKashman
Vice President
David Bogen Co., Inc.
Paramus, N. J.

Of Benefit

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Gilbert H. Mandeville,
Consulting Engineers
Seattle, Wash.

Sir:

. . . The [recent] issues of CONSULTING ENGINEER are extremely interesting and well prepared. I find your magazine worthwhile and a definite contribution to the practice of engineering. Congratulations on a job being well done! . . .

E. A. Drake
Vancouver, B. C.

Uncovered Covered Bridges

SIR:

It was a pleasant surprise to see the article in April CONSULTING ENGINEER on covered bridges by Mr. Richard S. Allen. The surprise lay in CONSULTING ENGINEER including such an interesting, informative article on one of our engineering heritages of early Americana — so distinctly different from what is generally included in its editorial contents.

The pleasant phase was in that I, together with others as I have noticed from your Readers' Com-

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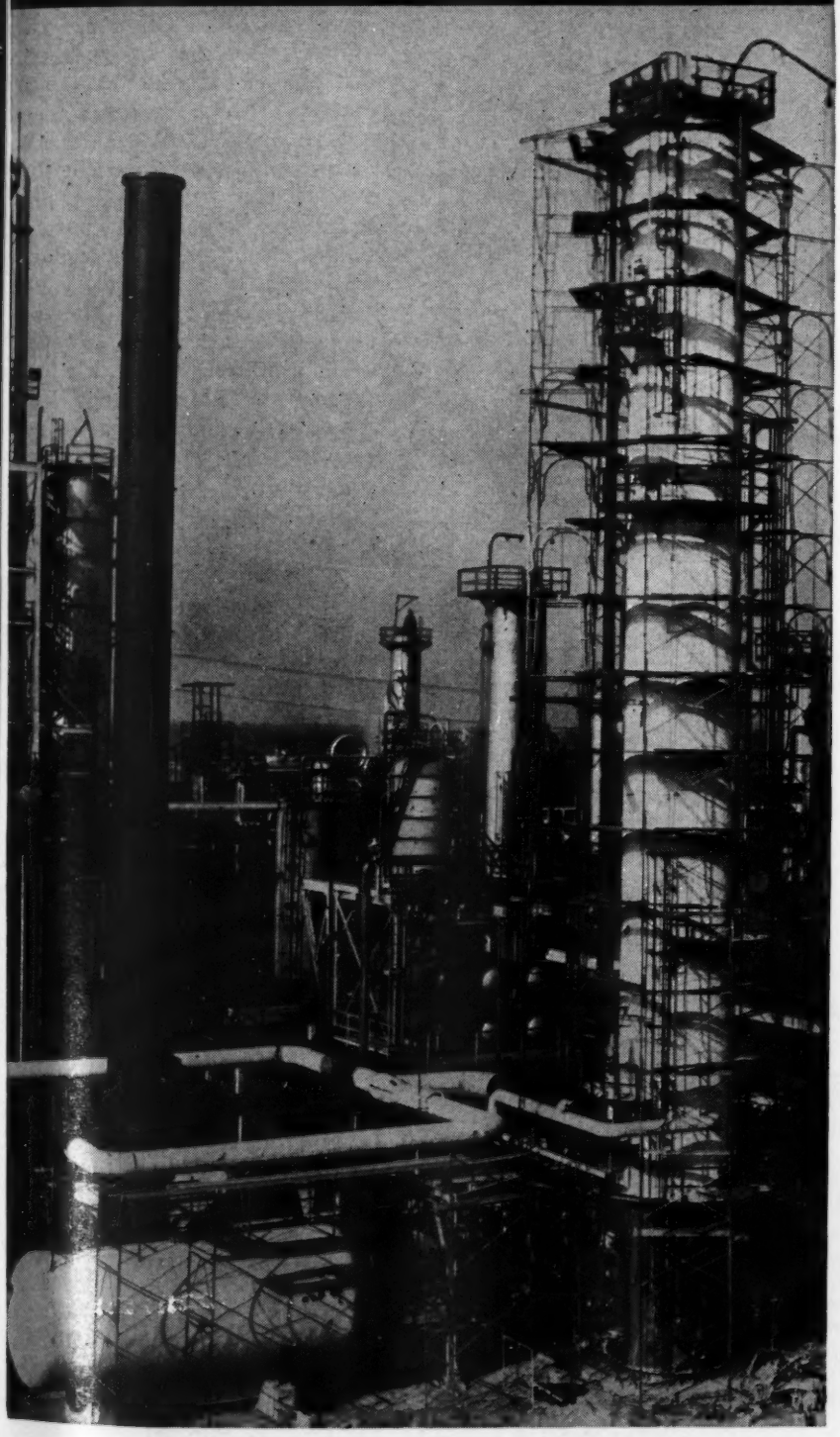

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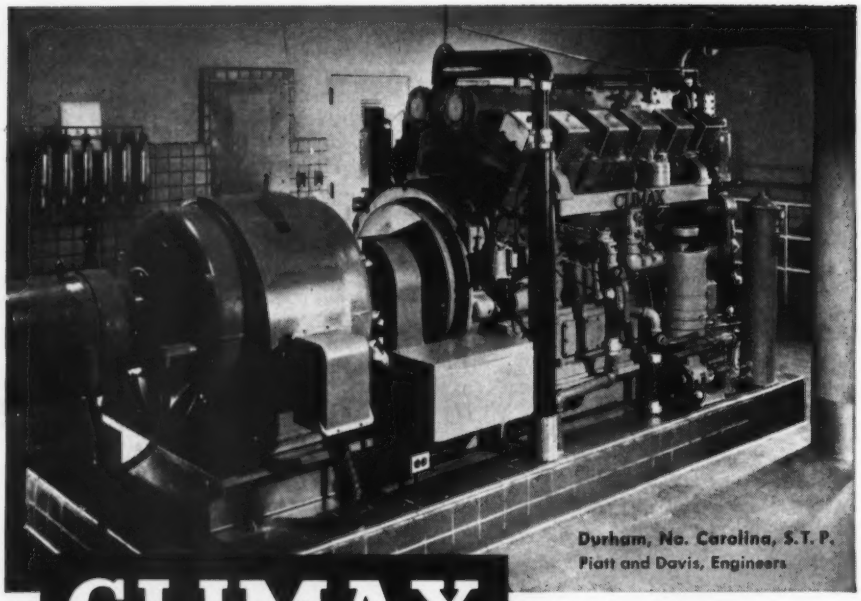

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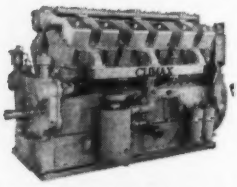

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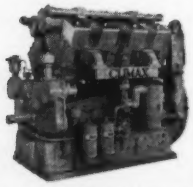
V-122—12 cylinder, 520 max. H.P. at 1200 R.P.M.



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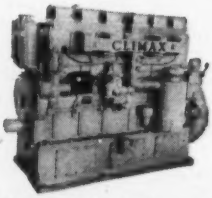

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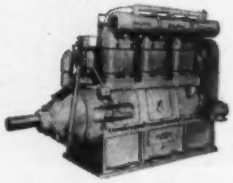

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ment columns, have enjoyed a great deal of satisfaction in hunting out these ancient "citizens" and studying construction details, service life, and difference . . .

The communication in the current issue (August) by Mr. Bilderbeck of Groton, Conn., referring to the Howe truss, has recalled to me a phase of wooden bridge construction I encountered a couple of years or so back.

I am accordingly passing it on to you. The Province of New Brunswick has many covered bridges and still in use; including the longest in the world at Hartland illustrated in Mr. Allen's article; and the next longest at Upper Dorchester (near Moncton) crossing the Memramcook River. This latter is right along the main line of the Canadian National, from Moncton to Halifax, N.S.

But the interesting aspect was the discovery on main traveled highways of covered bridge framing—without covers—using creosoted timbers. Three of the ones observed and crossed were Burr trusses, the longest 4, 152-ft spans. One other was a Howe truss with 2 spans of 94 feet, 8 inches.

The construction dates on these bridges were 1939 to 1945. I consequently thought that steel shortage due to World War II might be the motive for such construction. But the head of the bridge section of the Dept. of Public Works said "was entirely an economical decision. Creosoted B.C. Douglas Fir was not hard to procure and was not excessive in cost, and structures of this material could be placed [for] less than 50 percent of the cost of steel. Maintenance also is quite a factor in these creosoted spans, [for] as you know it is very expensive to clean and paint steel structures."

To my inquiry as to design of these bridges, undoubtedly supplanting previous old style covered bridges (which he confirmed); he replied: "the design of the creosoted spans is the same as for steel, namely: 20 ton loadings, Canadian Standard Association, using a working stress in tension of 1500 lbs on the wood."

George W. Armstrong
Ridgewood, N. J.

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ABOUT FOUR YEARS AGO it became clear that the Founder Societies were outgrowing the old Engineers Building, on West Thirty-Ninth Street, in New York. This meant that there would have to be a move to new and larger quarters, and some of the engineers in the provinces got the idea that it might be nice to get the headquarters out of Bagdad-on-the-Hudson and into the fresh country air of the hinterlands. Pittsburgh, which is in Pennsylvania, made the Societies an attractive offer, including an ante of several million dollars; and Chicago, a town in the Midwest, also made an attractive proposition.

At one time it looked as though one of these offers might have some chance of being accepted, but the smart money was always on Manhattan.

For a little while it even looked as though someone might think of putting this question of preferred location up to the whole membership, but that was quickly quashed. Then, one of the early committees appointed to look into possible locations seemed to think that places like Chicago and Pittsburgh might have some advantages, so it was necessary to appoint a new committee. That sped things along, and just a few months ago it was officially announced that after much study and careful investigation, New York City had been selected.

No one was really startled by the decision.

The actual site now has been selected, and we hereby offer to our readers an exclusive aerial photograph (page 128) of mid-Manhattan along the East River, complete with white arrow aimed at the spot where the new building will rise.

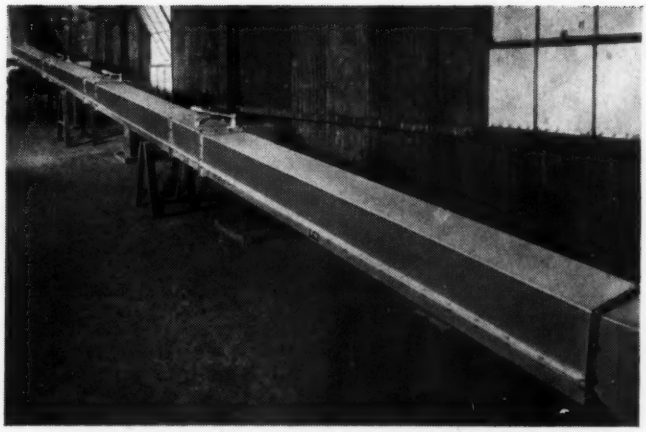
Actually, it is a splendid site, and United Engineering Trustees, current owners of the old building and future owners of the new, were fortunate to get it. The site is close upon the United Nations Headquarters, and it would appear that the hands-around-the-world spirit has been anticipated back in the committee rooms of the old Engineering Building, for the new building will be called "International Engineering Headquarters." There is some doubt in our minds as to whether the engineering institutions of other nations know about this, but the idea is a grand one.

If we sound just a trifle bitter about the location of the headquarters building, this is not because of the city selected. Rather, it is because of the run-around given the sincere offers of other cities. No one really in the know ever doubted the final selection, yet polite committees played around with Pittsburgh and Chicago as though they were seriously considering them. This wasted a lot of time and money and left a lot of hard feelings.

Now that all the foolishness is over, we agree that it was a good thing to select Manhattan. A lot of engineers live there, and those who do not are always glad to visit for a few days. Pittsburgh has some fine people and excellent sites, and Chicago has the hotel facilities, the transportation, and the Calumet City night spots, but most people would rather go to New York for a meeting.

There is another good reason for staying in New York. Nobody knows how many employees there are wandering around the Headquarters building. It is like the government. Count them today, and you are wrong tomorrow. The fact is that most of these are good employees who are honestly interested in serving the memberships of their societies. They are well trained, and on the average, they have a lot of years of service. Relatively few of these people, except those at the top, could have or would have moved away from the big city. The problem of filling their positions would have been immense.

So now it is settled, and if we do not like the way they went about it, we do like the end result. We are looking forward to a visit to the new International Engineering Headquarters, on the United Nations Plaza. It will never be quite the same as Thirty-Ninth Street, with its dark and uninviting lobby, but we will be happy if the consulting engineers promise not to specify automatic elevators in the new building. It was only the confident air of the elevator operator that gave us the courage to go above the first floor in the old Headquarters. ▲▲



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3. Discuss your requirements with a reputable manufacturer while your project is still in the formative stage.

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The Jefferson City Bridge was singled out for honorable mention by the American Institute of Steel Construction as among the most beautiful bridges* opened for traffic in 1955. This span across the Missouri River is typical of the more than 95 major bridges that have been built with USS High Strength Steels in the past four years.

The 3093'9"-long Jefferson City Bridge features a three-span continuous-tied arch unit with spans measuring 416', 640' and 416'. At present it carries a 28' roadway flanked by two 5' sidewalks inside the trusses, but sidewalks eventually can be moved outside the trusses to expand the roadway to 38'. USS TRI-TEN "E" Steel is used in trusses, web members and expansion devices.

Because USS TRI-TEN "E" Steel's yield point is 50% higher than that of structural carbon steel (ASTM A7) in thickness of ¾" and less, and because it has twice the resistance to atmospheric corrosion, it was possible to safely use this grade in lighter sections throughout.

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Here again, as in other important bridges built with USS High Strength Steels, the resultant accumulated savings add up to important cost reductions. (In some cases these have run as high as 15% of the cost of the structure.)

For further information on ways that USS TRI-TEN "E" and other USS High Strength Steels—USS MAN-TEN and USS COR-TEN—can be incorporated in your designs to provide maximum strength, safety and durability with a minimum of weight and costs, send for a copy of our "Design Manual for High Strength Steels." Write on your company letterhead to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

**The prize-winning "most beautiful" long span bridge—the Missouri River Bridge at Leavenworth, Kan.—was also built with* USS TRI-TEN *"E" Steel.*

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Design—Sverdrup & Parcel, Inc., St. Louis, Mo.

Fabrication—Truss span by Stupp Brothers Bridge and Iron Company, St. Louis, Mo. Approach superstructure by Pacific Bridge Company, San Francisco, Calif.

Erection—John Beasley of Dallas, Texas

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USS HIGH STRENGTH STEELS 1933 1957 24 YEARS OF PERFORMANCE

UNITED STATES STEEL

The Word *from* Washington

EDGAR A. POE
Consulting Engineer Correspondent

A SERIES of bills before Congress affecting consulting engineers will be alive and kicking when the lawmakers return in January for the second session of the 85th Congress.

The proposal by Senator William Langer, Republican of North Dakota, to place federally employed engineers and other scientific and professional personnel in a separate civil service classification is likely to come up for hearings. It is pending before the Senate Post Office and Civil Service Committee.

A BILL that would authorize the Chief of Engineers to publish for sale booklets, maps, brochures, and other material on flood control, river and harbor, and other army civil works projects was reported favorably in the closing days of the first session. The measure by Chairman Charles A. Buckley, of the House Public Works Committee, would authorize publication of any pertinent material.

THE measure, by Senator Jacob J. Kavits and four colleagues, to provide a $1 billion federal loan for the purpose of encouraging and assisting young people in obtaining higher education is now pending. No hearings have been held. The New York Republican, maintaining that Russia is overtaking the United States in the engineering race, said his proposal would stimulate an expansion in higher education, including engineering.

THE Jenkins-Keogh bill to encourage voluntary pension plans by self-employed individuals also will be pending. A number of organizations including the American Thrift Assembly are supporting the bill. The proposal would permit certain tax concessions in carrying out the retirement plan of self-employed persons.

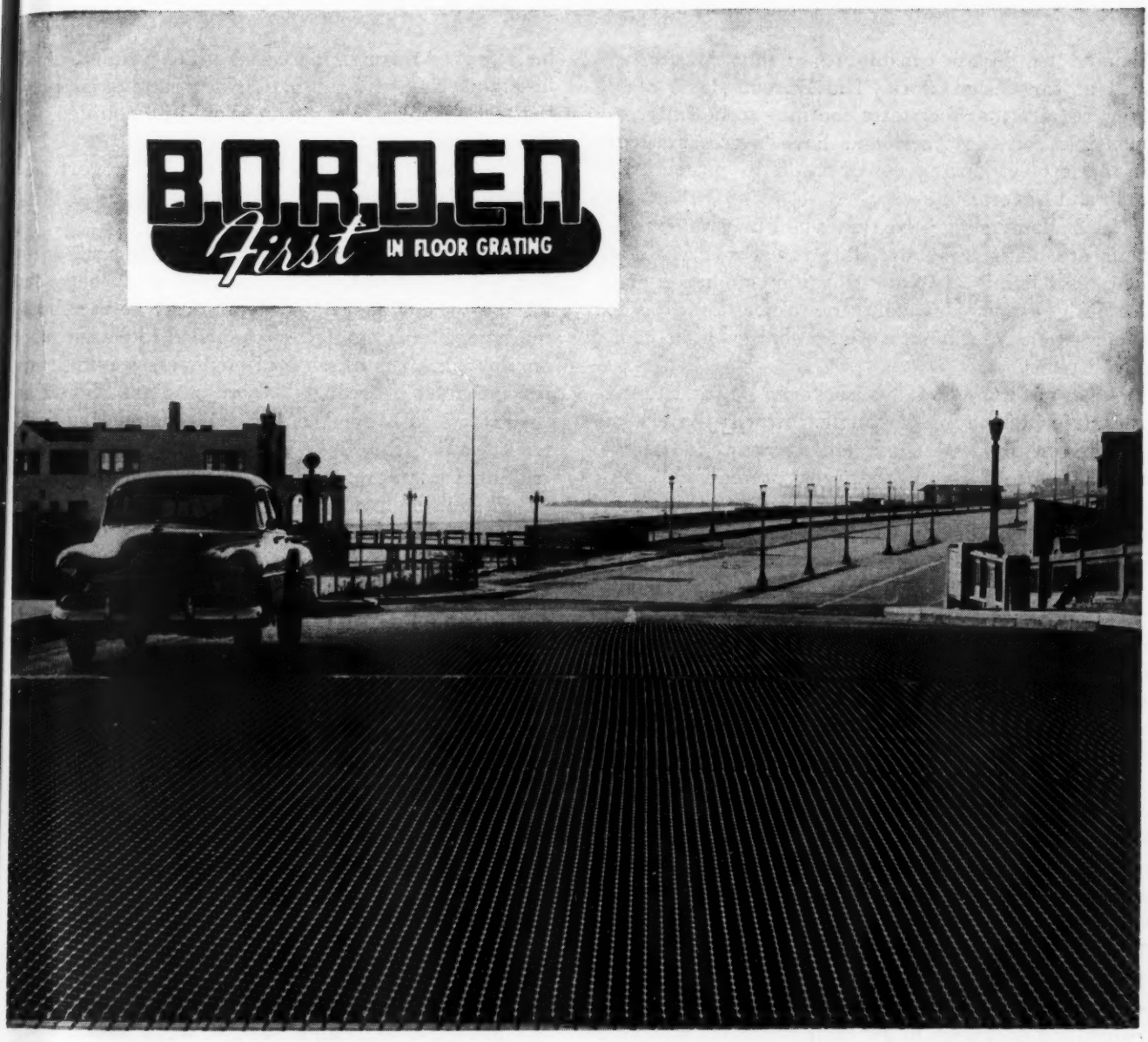
THERE has been some concerted opposition before the House and Senate Public Works Committees to pending provisions that would authorize the Tennessee Valley Authority to perform certain engineers' services for any new industry or interest within the TVA area.

Opponents, including the National Society of Professional Engineers and state professional societies, contend the far-reaching provisions would interfere with the professional activities of consultants. Furthermore, they maintain that such authority would be an encroachment of a Federal corporation into private enterprise. The proposal is incorporated in pending measures that would permit TVA to issue revenue bonds.

MR. Edward J. Wolff, president; C. C. Pate, 1st vice president; and L. K. Crawford, secretary of the Consulting Engineers Council met on July 11 in Washington, D. C., with Mr. Bertram D. Tallamy, Federal Highway Administrator and Mr. F. C. Turner, Deputy Commissioner and Chief Engineer of the Bureau of Public Roads. The purpose of the meeting was to discuss the resolution passed at the May 4 board meeting of the Council regarding the consulting engineer's part in the Federal-Aid Highway Program and the policies of the Bureau with regard to consulting engineers. It was learned at this meeting that the "Anti-Piracy" clause, as contained in the Bureau's memorandum of Dec. 31, 1956, has been withdrawn by memorandum to regional and division engineers dated July 3, 1957, leaving the matter entirely to the discretion of the individual state highway departments.

Mr. Tallamy stated that one of the reasons for the attitude of Bureau and state highway personnel relative to the use of private consultants is that the design work done by some consultants has not been up to standard and the corrective measures increased the costs for state highway departments and the Bureau. Mr. Tallamy did acknowledge the fact that many private consultants are doing superior design work. His ideas along this line were expressed in a recent memorandum in which he wrote, "In approving contracts for consulting services on Federal-aid highway projects, BPR division engineers should ascertain that consulting engineers are not only qualified technically but are organized and have the manpower to handle the work with necessary promptness. On Interstate projects, steps must be taken to insure that the consultant is entirely conversant with design standards required for such projects."

The policies of the Bureau do not preclude the use of private consultants on supervision of construction.



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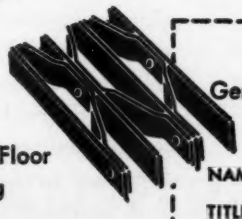

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Some states do use consultants in this capacity as well as for design work. The Bureau does, however, require that the states continue to be fully responsible for the work and have representatives on the project during construction to protect the state and Federal interests.

Mr. Tallamy suggested that when private consultants are being used, the state and Federal representatives jointly visit the consultant's office during the design stage to expedite the project and to help avoid extensive changes after submission of completed plans.

What was thought to be resistance by the Bureau and state highway departments towards the use of private consultants was explained as more in the nature of natural rivalry between professional men engaged in the same type of work rather than actual opposition. The basic Federal-aid highway acts require that all state highway departments maintain adequate staffs. The interpretation of what constitutes adequate staffs is an administrative function of the Bureau.

Mr. Tallamy stated that the consulting engineers now have a wonderful opportunity to prove their worth in the Interstate program and if they do not become a permanent part of this planning team, it will be because of their own failures.

ENGINEERS agree that illumination would be a tremendous safety factor for night driving on the vast Interstate highway system. The American Road Builders' Association is advocating that steps be taken to light much of the mileage. The Association is suggesting that state highway departments employ trained personnel in lighting and engage consulting engineers to get their programs launched as soon as possible.

CHAIRMAN James O. Eastland of the Senate Judiciary Committee said indications are Congress will pass a Federal Construction Procedures Act prescribing fair bidding procedures to govern the awarding of Federal-lump sum contracts in excess of $100,000. The proposal will curb bid shopping and bid peddling. The Senate measure is similar to the House-passed bill.

THE Council of State Governments, after a detailed nationwide survey, reports that current hirings of engineers by state highway departments does little more than offset staff losses. The immediate shortage is estimated at 4000.

The Council, supported by the 48 states and the territories, said the number of engineers employed by the departments must be increased from a current 9000 to a future 30,000, if the minimum demands and conditions are to be met in the immediate years ahead. Utilization of engineer personnel must be improved through increased use of people trained in engineering, and the nationwide ratio of supporting technicians per engineer should be doubled, the Council said.

Other pertinent points in the Council report pertaining to engineers and engineering included these declarations:

There should be wide adoption of new procedures and techniques and redistribution of work loads; the number of engineering students must be increased; more graduates should be persuaded to choose state employment; the number of engineers leaving state service must be reduced; more students should be persuaded to specialize in civil engineering; and consideration should be given to subsidizing college training for subprofessionals who have shown promise in state highway employment.

The largest part of the new demand will have to be provided by subprofessionals trained for specific technical and other assignments formerly performed by fully trained engineers, said the Council report. Shortage of supporting personnel is extremely acute. The report is now in the hands of the various governors and some members of Congress.

A QUESTIONNAIRE by the National Society of Professional Engineers showed the median salary and income for the engineers in 1956 to be $9490, as compared with $7850 in 1952. The survey said engineers employed by Federal agencies had received smaller increases than those working for industry and those who are self-employed.

On the other hand, while the survey did not say so, those employed by the Federal government, have numerous fringe benefits that the self-employed do not have. These include five-day work weeks, liberal vacations and sick leave, and retirement plans.

THE Federal Government is the Nation's foremost buyer of goods and services. The 1958 Defense Department Appropriation bill that will go to the White House will total about $34 billion.

SENATE and House Committeemen, on the District of Columbia committees, said pending companion bills that would exempt electrical contractors and electricians from the D. C. Professional Engineers' Registration Act, appear "dead as a door nail." However, they could be revived in the new year. The amendments would permit the electrical contractors and electricians to design and diagram electrical projects without their being registered as professional engineers.

A number of state engineering societies, on the ground the bills would set a dangerous precedent, aided in getting them side tracked. If passed by Congress for the District of Columbia, state legislatures might be lobbied into following the D.C. lead. ▲▲

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The Reader's Guide

Lloyds Cannot Renew Policies

The first article in this issue is a staff report on errors and omissions insurance. If you have a policy of this type now in force or if you are giving some consideration to taking out an errors and omissions policy, it would be a good idea for you to read carefully the information on pages 82 and 83. It turns out that now that Continental Casualty Co., an American firm, has made available an errors and omissions insurance policy, this means that under most state laws Lloyds of London cannot offer to renew for their current policy holders nor can they offer new policies. Most state laws seem to strongly favor American insurance companies. Foreign companies can only handle business of a type the American companies do not want or refuse to write. This story is just days old, and it is quite likely that you will know the situation even before Lloyds does. An American company is stepping into the breach, and in our next issue they will explain the details of the new policy they have to offer. The H. C. Hauth Co., of New York, who now are brokers for the Lloyds policy, will handle the new policy as underwritten by the American firm.

Drive-In Designs

Today, the average American feels that it is a great imposition to have to walk more than a few steps at a time, and it would appear that the future American will need only one leg—strong enough to manipulate a power brake—and an extra long finger for punching gear buttons. He possibly may develop a flexible left arm suitable for reaching out of the automobile and into a drive-up window. It is the job of the consulting engineer to accommodate this man's needs, and already some serious thought has been given to the proper design of drive-in facilities. In this issue, Robert G. Dyment, provides a very complete description of the demand for drive-in facilities, and he tells how the consulting engineer should go about designing them in various sizes and shapes. With the extremes now available in automobiles, all the way from the Isetta to the Cadillac, it is not going to be easy to design a window to fit everyone's reach. See page 84.

Over or Under the Channel

It would seem that interest is again reviving in a project to put England in direct contact with the Continent. There has been a little talk recently of a bridge from Dover across the Channel to France, but the more practical approach would seem to be a tunnel under the water. Tunnels have been planned ever since the time of Napoleon, and the British even got so far as to begin digging in 1880. The projects were never carried through, largely for military and political reasons. There were always influential men in high government posts who felt that any direct connection between England and the Continent would be dangerous in the event of war. Now,it is obvious that a bridge or a tube connecting England with the French coast would be of but minor importance in war. England has more to fear than the possibility of a few troops sneaking through a tube before it could be flooded. With atomic bombs dropping and atomic artillery firing, it is quite unlikely that anyone would even remember whether there was a tube. It would be militarily less important than the Hudson Tunnel. Our English correspondent, F. C. Livingstone, now reports, on page 118, that stock in the Channel tube company has risen rapidly and preliminary plans are in process. It could be a great incentive to commerce, and we hope they do better this time than they did 57 years ago.

What You Can Deduct

Carl H. Ristau, author of the article, "Entertainment, Travel, and Your Income Tax," is the right man to tell you what to do about this aspect of your business. In fact, up until a few years ago, if he had turned up in your office, he might not have been overly welcome. He was with the Internal Revenue Service, and it was his job to make sure you deducted only the proper business expenses on your income tax. He is now in private practice as a Certified Public Accountant, but you can be sure that his prior experience serves him well. Even Mr. Ristau cannot make it possible for you to deduct more than the law allows, but he does show you how to keep out of trouble and how to charge as much as is legally possible to legitimate business expense. He admits to us that he does not keep all of his own business records as accurately and completely as he recommends in this article, but he insists that he now intends to do better.

Air-Conditioning Large Buildings

This month we are trying something new. We usually avoid articles dealing with specific projects, for we feel that our readers expected something more from a monthly magazine than a few case histories. However, it is true that one can learn by example. So, we decided to pick one special field of engineering and present short descriptions of a few outstanding and recent projects. For our first of these Project Reports, we selected "Air-Conditioning Large Monumental Buildings." It did not take long to find five excellent designs. Then we had Mr. Alfred L. Jaros, Jr., of Jaros, Baum & Bolles, write a covering introduction, and the result will be found on page 89. Everyone interested in the air-conditioning of buildings of this type will find something of value in Mr. Jaros' article, and in the five projects described.

Town and Country

Arthur W. Consoer, of Consoer, Townsend & Associates, admits that he is a suburbanite, with a rural home in Montague, Mich., and another well out in Park Ridge, Ill. However, his interests have recently turned to the possibilities for development of urban areas. He thinks that living in the city could be much more pleasant than it is now, and he sees whole areas of fine apartments and shopping centers on sites now covered with substandard housing. In his article, on page 114, entitled "We Can Guide Urban Growth," he tells what the consulting engineer should know about city development projects. He suggests that the rapid growth of fringe areas can be reduced or even halted by the proper use of in-town space.

Here, There, and Everywhere

There are a number of interesting developments reported in our departments this month. From the West Coast, Ralph Torgerson reports on page 62 the experiences of a number of consulting engineers in employing engineering students and lady engineers. Most of these consultants reported considerable success. He also gives a brief review of a talk made by Bill Moore, of Dames & Moore, in which it is shown that a consulting engineer firm can lose money if the owner fails to charge properly for his own time.

Marjorie Oden, our Eastern Editor, tells about the site selected for the new International Engineering Headquarters building which will be erected on a site near the United Nations Plaza. This, as well as a great deal of other information on activities of the various societies, will be found in the department "Heard Around Headquarters," on page 40.

Miss Oden also collected a considerable amount of interesting information in the "East Coast Report," on page 128. Here she tells about difficulties that face engineers who sign Public Housing Authority contracts. It would appear that the engineer is liable for just about everything, no matter who is at fault. The New York Association of Consulting Engineers is making an effort to get the contracts changed. The "East Coast Report" also tells about progress being made by the New York Association in connection with a group hospitalization policy for employees, and there is a report on a salary survey recently made among New York consulting engineers.

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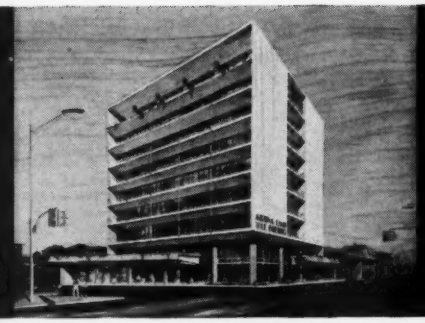
DESIGN NEWS



Arizona Land Title & Trust Co. Building, Tucson, Arizona, is now under construction using 95,000 sq. ft. of Fenestra Holorib Reinforcing Forms.

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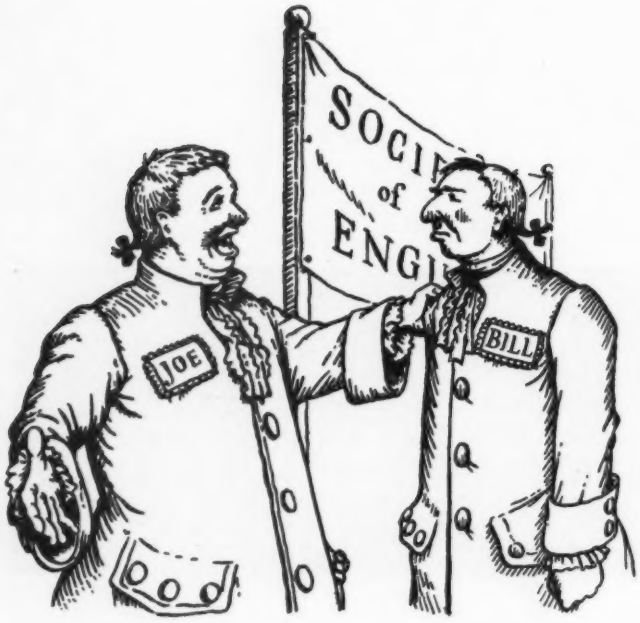


Heard Around Headquarters

STAFF

Details on the new international engineering headquarters finally have been released—the building will be located on United Nations Plaza, on First Avenue at East 48th St. It will replace the old Engineers Building on 39th Street, which served as headquarters for 51 years.

Seelye, Stevenson, Value & Knecht will be structural engineers; Jaros, Baum & Bolles will handle mechanical and electrical engineering; and Shreve, Lamb & Harmon are the architects.

United Engineering Trustees Inc., representing the ASCE, the ASME, the AIME, and the AIChE, bought 37,500 square feet of property for approximately $2,700,000. A large parcel of the land, belonging to Socony Mobil Oil Co. Inc., will not be taken over by UET for one year, according to the contract.

Cost of the new center will be decided after an analysis of the societies' anticipated square footage requirements projected to 1975. However, $10 million has been mentioned as a tentative figure. Preliminary drawings show a 20-story tower type contemporary building.

What will happen to the Engineers Club? As things now stand, the directors say they will remain in their present location. The board previously decided that they would not move the club east of Third Avenue because they would lose the luncheon business. Although the directors realize that much of their present business comes from the Headquarters Building, they decided that staying in their present location is the lesser of two evils.

Since the new headquarters is under a nonprofit organization, donations will qualify as tax-exempt. If the Engineers Club moved into the building, the tax picture would be changed, or at least it would introduce complications.

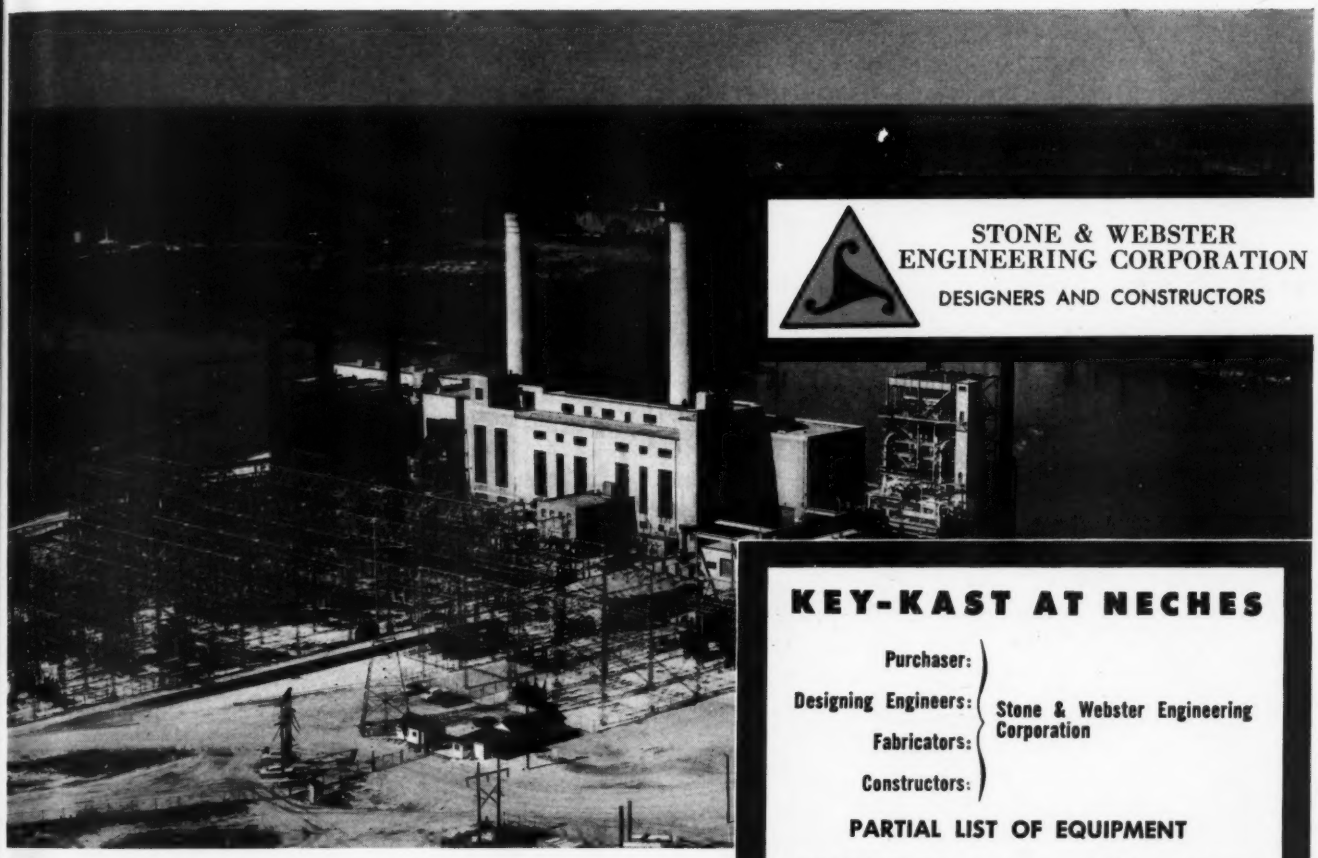
Fifteen societies, not currently located in the Engineering Building, have been invited to move to the new international center.

A few years ago, Pittsburgh business and industrial interests offered $1,500,000 and the Mellon family pledged $500,000 more if the center would be relocated in Pittsburgh. Other lures were offered by Chicago, Philadelphia, St. Louis, Washington, Hoboken, Kansas City, Miami, and Shreveport, La.

In 1955, when a committee of past presidents and the five societies recommended a move to Pittsburgh, opposition was heard from many quarters. As a result, a new committee was formed, and it decided unanimously to retain the center in New York.

ARROW POINTS TO SITE SELECTED FOR NEW ENGINEERING BUILDING ON FIRST AVE. AT E. 48TH.

NSPE members from New York, New Jersey, Pennsylvania, Connecticut, District of Columbia, Maine, Massachusetts, Maryland, New Hampshire, Rhode Island, Vermont, and Delaware will get together in New York City on Oct. 5 to discuss that



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Service: Main Steam

KEY-KAST 90° Welding Wye

12¾" x 9.3" x 9.3" O.D.
Material: 2¼% Chrome, 1% Moly, ASTM A-217 Grade WC9
Temperature: 1000° F.
Pressure: 1695 psig
Service: Main Steam

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unmentionable topic — corporate practice. This will be the first time representatives of the Northeast Area NSPE have gotten together to discuss corporate practice, and an estimated 100 persons are expected to attend. A summary of the discussion will be presented at the NSPE annual convention.

EUSEC and ECPD will have a joint meeting in Paris on Sept. 16-20 to compare engineering education in Europe and America. The conference is to discuss methods of possible international recognition for engineers.

Membership in the American Society of Civil Engineers, oldest of the Founder Societies, now has passed the 40,000 mark. The ASCE has 75 regional sections and 63 branches, with members located in 101 countries besides the United States. The ASCE also is eyeing the 10,000 prospective members now in student chapters.

Unity, and the AIEE proposal for joining all engineering organizations into groups of educational, technical, and professional responsibilty, is the topic of the day around headquarters.

The proposal of M. S. Coover, former AIEE president, suggests:
¶ EJC represent the engineering profession on technical matters.
¶ ECPD provide the medium for guidance on everything pertaining to engineering education.
¶ NSPE undertake general promotion of the professional aspects of engineering and handle the financial problems of engineers.

So far, the AIEE officers have given Coover's proposal their support, but the proposal has not been submitted to the membership at large.

Among the other Societies, some organizations are for the idea, others are considering it. And, generally, there is considerably more talk than action.

ASME—President William F. Ryan plans, at the Nov. 30 board meeting, to ask that the ASME take action to work toward putting the AIEE proposal into action. "I'm going to ask them to stop talking and act," Dr. Ryan added. And, unlike many presidents at the end of their terms, he is not going to ask for any radical change in structure, "just that they use the present structure to advantage."

"If everybody would concentrate on unifying the engineering profession, it could be done in a year and a half." Dr. Ryan added that the merger of engineering organizations has been in the discussion stage for a period of about 70 years now.

AIME—The miners have not circulated the Coover proposal among their members yet because they do not know if they agree with it. A committee, headed by T. B. Counselman, of Behre, Dolbear & Associates, Consulting Engineers, has been appointed to

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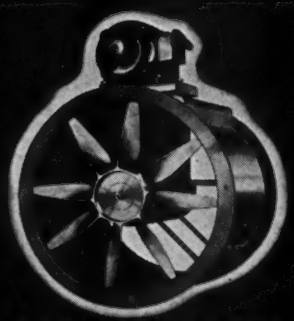

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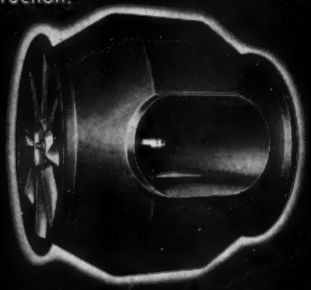
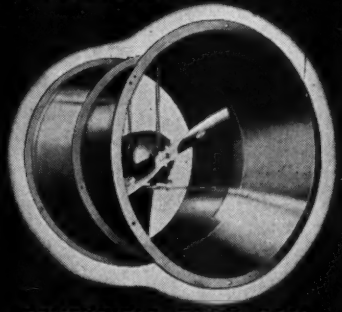


BI-PASS DUCT FAN

This special model, with motor mounted in a tunnel completely out of the air stream, is designed for moving corrosive fumes and air at temperatures as high as 550° F. Six sizes, 19" to 41"



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study the AIEE proposal and report at the Sept. 23 executive committee meeting.

ASCE—The board of direction, on June 3, voted that the Coover proposal "not be published in *Civil Engineering* at this time."

AIChE—The Coover proposal has not been printed in the Society publication, nor has it been discussed at a board meeting.

NSPE — The *American Engineer* reprinted Coover's proposal, and a committee of past presidents has been appointed to study the AIEE proposal.

ECPD—President Morris D. Hooven has long worked toward unifying the profession. However, the ECPD is having unity problems of their own right now. The NSPE, the IRE, and the IAS (Institute of Aeronautical Scientists) have applied for membership in the ECPD. However, before they can join ECPD, the 25-year-old charter must be amended. Three of ECPD's eight members (AIChE, ASCE, and Engineering Institute of Canada) want more information on how ECPD might be affected by a larger membership before they vote on the addition of the three applicants. The three, if accepted, would increase the present membership by 30 percent.

Since the amending of the charter requires a two-thirds majority, the matter depended on which way the Chemicals—the last group to vote—decided. They tabled the motion, pending further study.

The prospect of the NSPE joining the ECPD has interesting possibilities. It has long been known around headquarters that a merger of ECPD and EJC is favored by many. Which — in effect — could make NSPE an associate of EJC.

At present, the EJC and ECPD merger is not even discussed in public because the two groups have different income tax classifications. At present, donations to ECPD are tax-free. However, the EJC is studying its tax situation with an eye to working out some-

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thing which would allow a future merger.

ASRE, ASHAE — About five years ago, a committee was formed to discuss the consolidation of these two groups. H. F. Spoehrer of St. Louis, ASRE president, recently pointed out "this is something that will undoubtedly take truly careful study and probably cannot be accomplished in less than five to ten years."

Consulting engineers, in Washington, D. C., are preparing a constitution and bylaws for a District of Columbia Consulting Engineers Association.

Kenneth W. Cobb, of Kluckhuhn, Cobb & McDavid, chairman of the steering committee appointed at a meeting last November, pointed out that all proposals thus far are purely tentative, and have not been presented to the interested engineers for approval. The steering committee, however, is going to propose that:

Membership will be limited to "sole proprietors, partnerships, or corporations primarily engaged in the practice of consulting engineering, relating to the construction industry as a professional service without conflicting commercial interest." (Cobb pointed out that "conflicting commercial interest" will include governmental, industrial, utility, and other interests not primarily of a consulting nature.) No provision has been made in the proposed constitution for associate members. Each consulting firm represented will be allowed one vote.

Initiation fees to be suggested are $100, with $50 annual dues.

The steering committee met in late July, and a meeting of the 20 to 30 firms that have indicated an interest in forming a consulting engineers association will be called as soon as possible.

Several years ago, a group of Washington consulting engineers attempted to form an association, but their plans never materialized.

Cobb said, "It seems to me, and I believe I speak for many of the

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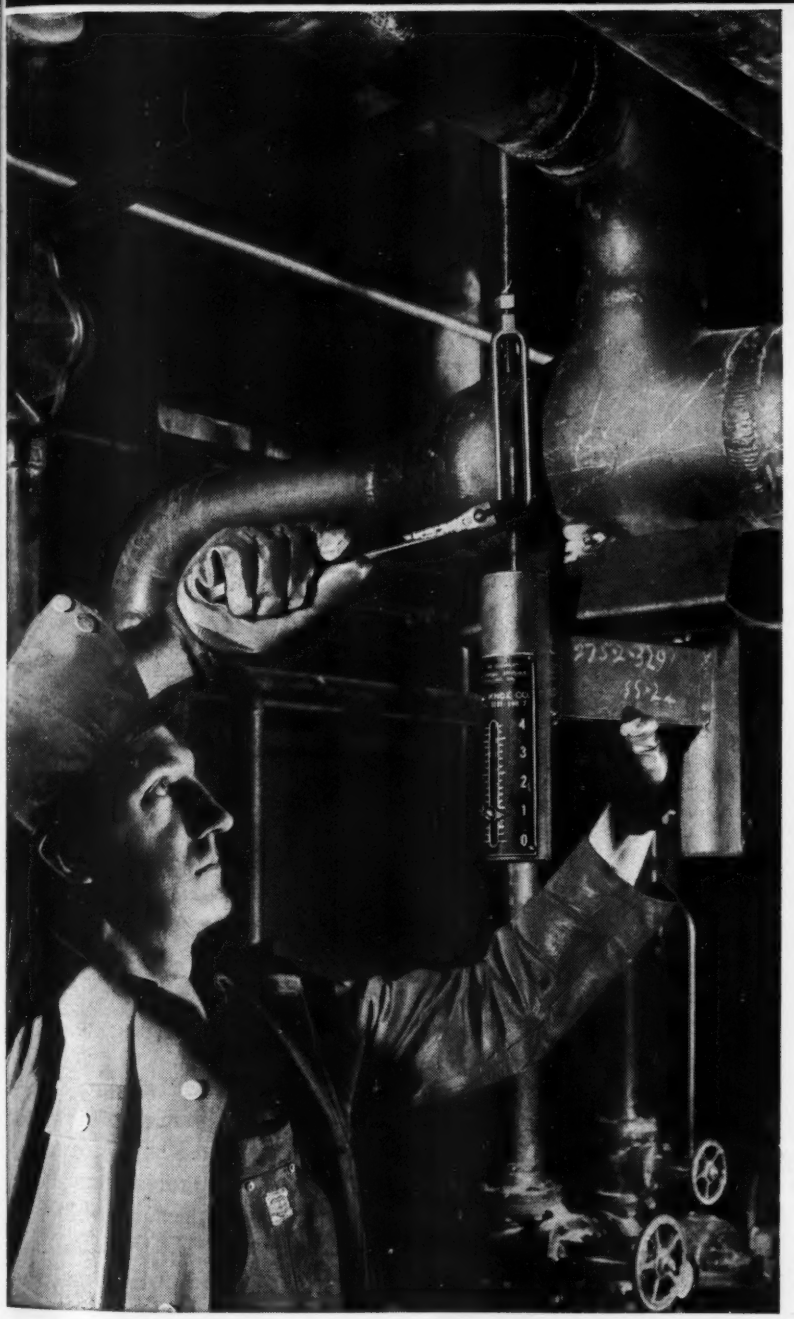

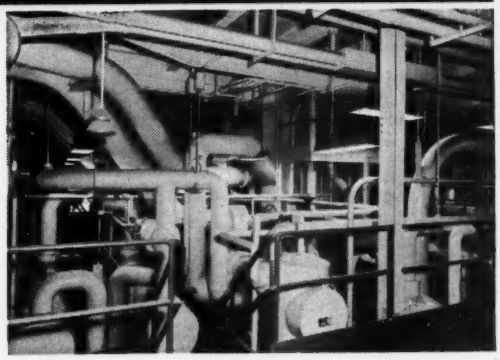

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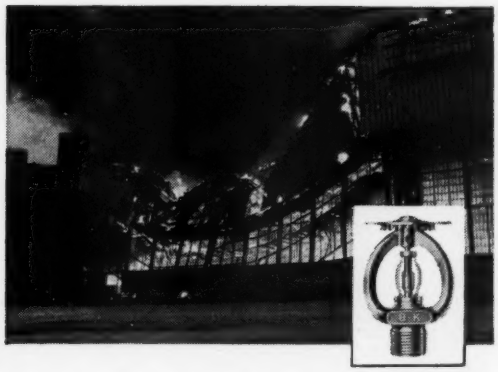

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Blaw-Knox trapeze functional spring hanger installed in first large atomic generating station. Vital power piping system for the atomic generating unit in the Duquesne Light Company's Shippingport Station is supported by Blaw-Knox custom-engineered hangers.

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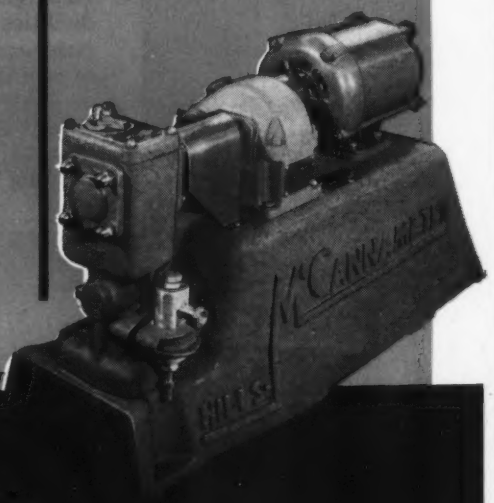

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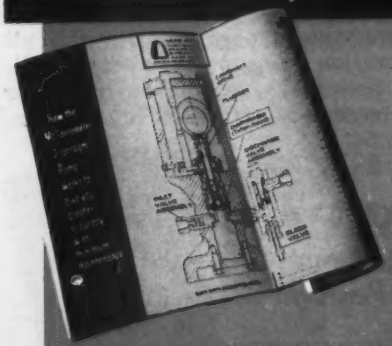

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engineers in this area, that we have long needed an organization by and for the consulting engineer. Like every other field of endeavor, consulting engineering has its problems which are unique to itself and a forum where these and corollary matters may be discussed, we feel, is found in the Consulting Engineers Council."

Communist red tape goes further than their diplomatic relations, the ASME is learning.

Recently, a routine invitation was sent to a Russian engineer asking him to attend an international meeting in the United States. The reply — an acceptance — was prompt. But the acceptance was for an invitation issued in 1954. The engineers are waiting to see if the Russian will attend the meeting.

A recent order for 50 copies of some ASME transactions also was received in headquarters. The copies were to be sent to Red China, but since there is no mail service to Red China, the reply was ignored.

Soon a request for the same 50 copies came — from a different person — in Hong Kong.

Howard C. Pyle, president, director and chairman of the executive committee of Monterey Oil Co., Los Angeles, has been nominated 1958 president-elect of the three-pronged AIME.

Pyle's nomination was presented by the Society of Petroleum Engineers of the AIME, the society designated to nominate the 1959 president. The Society of Mining Engineers will designate the 1960 president, and it will be the Metallurgical Society's turn in 1961.

Pyle has been a director of the Institute since 1955, and was chairman of the Petroleum Branch in 1947. He also is a director of the American Petroleum Institute and the Western Oil & Gas Association. Current AIME president is Grover J. Holt, of Ishpeming, Mich. ▲▲

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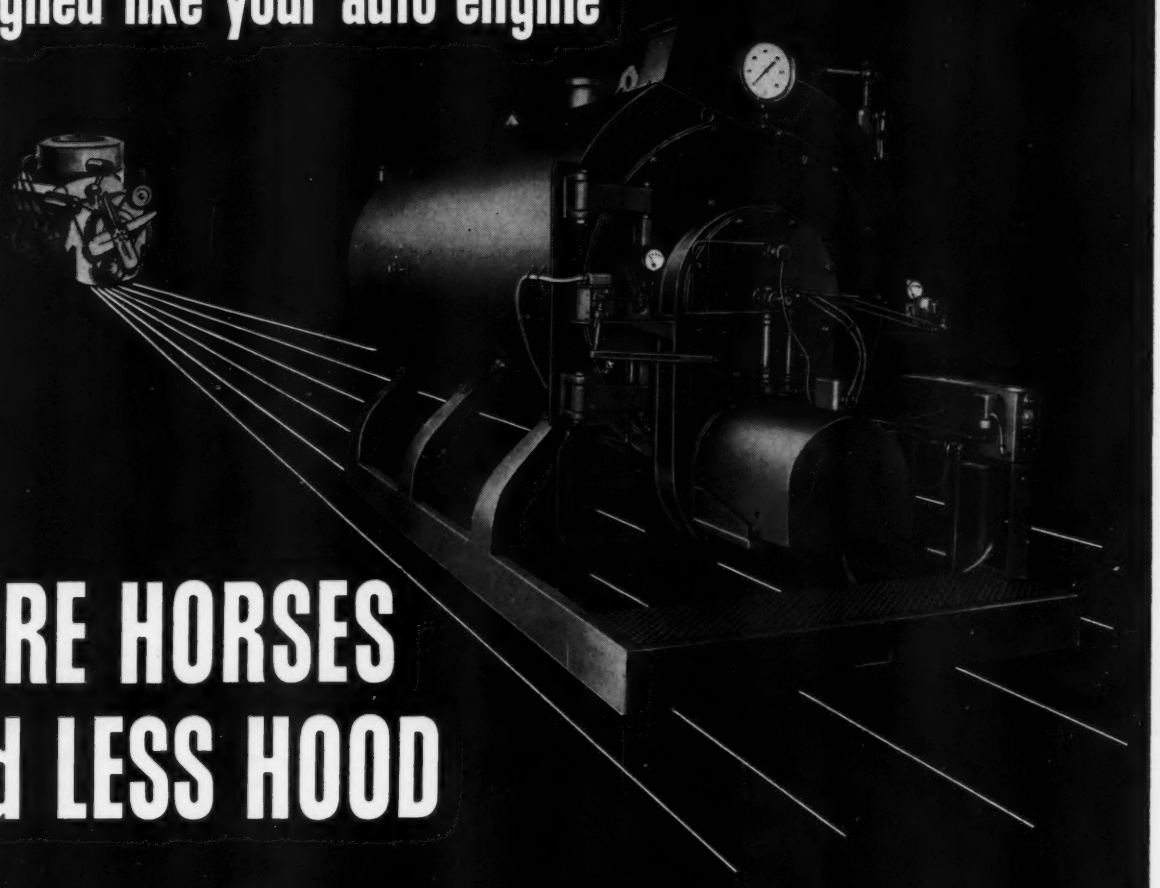

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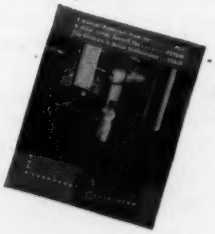

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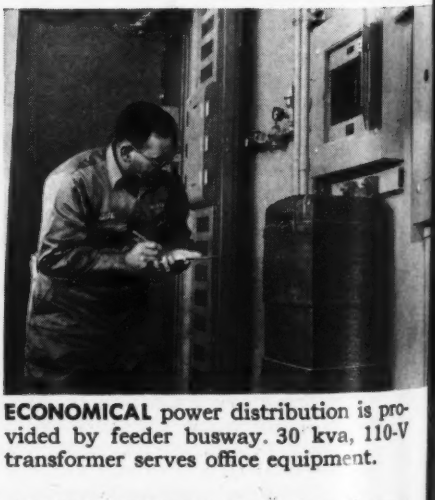
SAVINGS OF $90,000 were obtained using G-E 480Y/277-volt systems in Exchange Bank, Braniff Building in background.

General Electric system-engineered equipment

PLANNING: W. Marshall, J. Glendinning, G-E; consultants J. M. Guerrero, E.B. Gamble; G.M. Bostock, Park V.P.

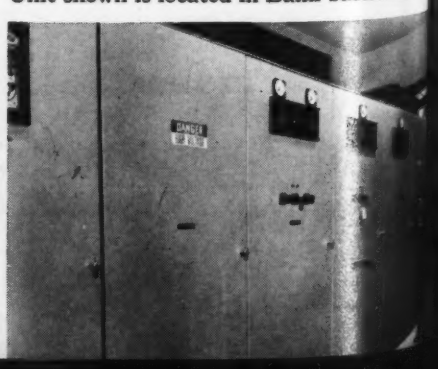
HIGH VOLTAGE LIGHTING at 277 volts creates savings by combining light, power source. Modular design permits flexibility.



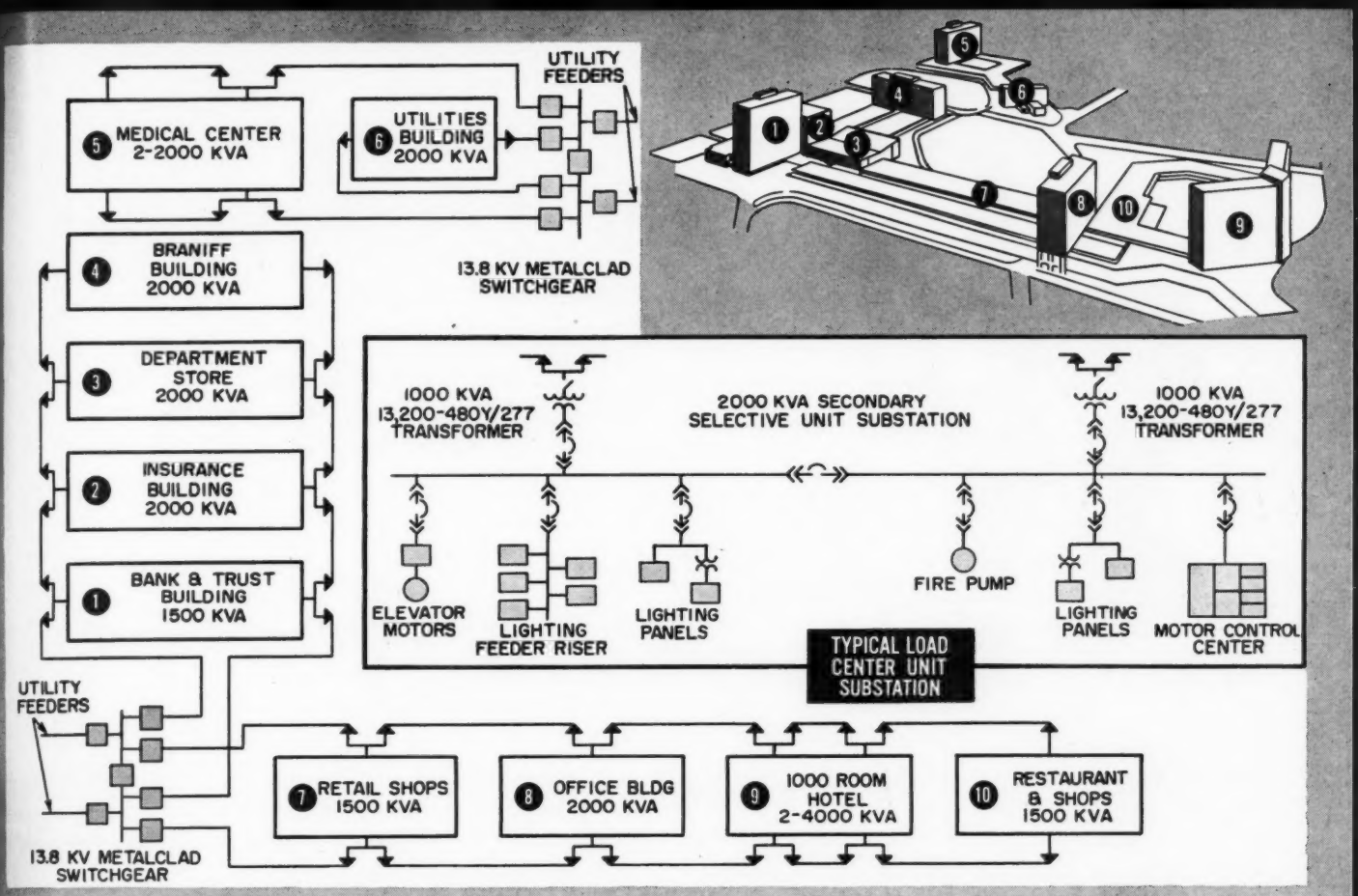
ECONOMICAL power distribution is provided by feeder busway. 30 kva, 110-V transformer serves office equipment.

COMPACT G-E Type DA7093 motor control center takes power from feeders to control all motors safely.

1500 KVA double-ended load center unit substation is typical of the units that will supply power in Exchange Park buildings.



PROJECT POWER is from two line-ups of G-E 13.8 kv metalclad switchgear. Unit shown is located in Bank basement.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MOTOR CONTROL CENTER
TYPICAL LOAD CENTER UNIT SUBSTATION
UTILITY FEEDERS
7 RETAIL SHOPS 1500 KVA
8 OFFICE BLDG 2000 KVA
9 1000 ROOM HOTEL 2-4000 KVA
10 RESTAURANT & SHOPS 1500 KVA
13.8 KV METALCLAD SWITCHGEAR

FLEXIBLE, ECONOMICAL POWER distribution system for entire Park Project is contained in one-line diagram. Numbers key equipment to Project buildings. Completed Utility Building also uses General Electric 480Y/277-volt equipment.

serves power needs of "city within a city"

$125 million Exchange Park Project in Dallas shows how General Electric's "system approach" is key to flexible, economical commercial power distribution.

To keep pace with the Southwest's vigorous economic growth, a $125 million commercial center is rising on 120 acres four miles from downtown Dallas. Known as Exchange Park, this community represents one of the most advanced city-within-a-city developments yet attempted in the United States. It is scheduled for 1960 completion. Nine major buildings, parking for 15,000 cars, 40-foot-wide air conditioned malls, 150 retail shops, and other facilities will enable shoppers to take care of every personal and business need in scientific comfort. Already completed: Exchange Bank and Utility Building.

SELECTING THE BEST POWER DISTRIBUTION SYSTEM, to satisfy Exchange Park's heavy load concentration efficiently and economically, required thorough system analysis early in project planning. G-E engineers, working closely with Mr. George M. Bostock, Vice-president and Engineering Manager of Exchange Park and his consultants*, recommended a 480Y/277-volt secondary selective system as optimum. General Electric also provided basic system layout, service engineering and installation assistance at the site.

ADDED VALUES stem from adoption of G-E system recommendations. Exchange Park's 13.2 kv distribution system has capacity for load growth. Secondary selective system features permit reliable operation. Utilization of 480Y/277-volt system means fewer, less-metal circuits and substantial dollar savings. Using 480Y/277-volt equipment in only two of nine buildings, for example, saved $90,000.

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*Architect: Lane, Gamble and Associates Consultants: Blum and Guerrero
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Engineered Electrical Systems for Commercial Buildings

GENERAL ELECTRIC

The Legal Aspect

MELVIN NORD, P.E.
Consultant in Legal and Technical Problems
Patent Attorney

Atomic Energy Law (International Aspect)

Let us suppose that our mythical Atomic Corporation intends to enter into a contract with an Australian company and also with an Indian company for the erection of a new type of atomic power reactor in those countries, following the successful operation of a prototype plant in the United States. What legal obstacles will arise?

Nuclear Business Abroad

A crucial legal obstacle to international business in atomic energy is Sec. 57a (3) of the 1954 Atomic Energy Act, which reads as follows: "It shall be unlawful for any person to. . . directly or indirectly engage in the production of any special nuclear material outside of the United States except (A) under an agreement for cooperation made pursuant to Section 123, or (B) upon authorization by the commission after a determination that such activity will not be inimical to the interest of the United States." In the contract with Australia, this is no great problem, since the United States has adopted an agreement for cooperation (generally termed a "power bilateral," adopted June 16, 1956). But with India, it is a very serious problem, since we have not as yet entered into an agreement for cooperation with them, and the operation of a nuclear reactor in India will "indirectly [produce] nuclear material outside of the United States."

In dealing with India, therefore, we must either hope that such an agreement for cooperation will be entered into in time (and perhaps try to do something to accelerate it), or else rely on subsection (B) of the quoted section and obtain authorization from the AEC. The ratification of the Statute of the International Atomic Energy Agency (which is expected very soon) will not solve this problem, since it is not an agreement for cooperation under Sec. 57a (3) and Sec. 123, but an international arrangement (a treaty) under Sec. 121. For example, it contains no provision for the exchange of restricted data nor for sale of reactors, but is primarily a clearing house for unclassified information and an international atomic pool.

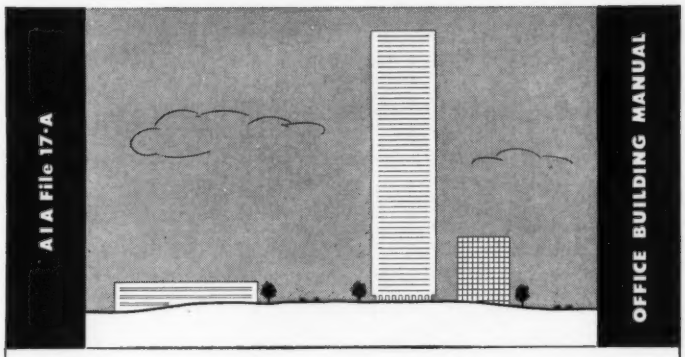
Obtaining Authorization

The AEC has adopted regulations relating to the method of obtaining an authorization. (Part 110, printed in the Jan. 20, 1956 issue of the *Federal Register*.) Rule 110.7 provides a general authorization for certain countries (not excluding India) but only if the activity "does not involve the communication of Restricted Data or other classified information.." Undoubtedly the project in question includes restricted data, since "the use of special nuclear materials in the production of energy" is involved. This information is "born classified" (Sec. 11r, Atomic Energy Act of 1954), and will presumably not have been removed from the Restricted Data category, since it involves privately developed information not under direct governmental control, and it would not be advisable for our corporation to disclose all its information even if it so desired.

Thus, to contract with India, it will be necessary to obtain specific authority under Rule 110.8. The contents of the application, and the necessary reporting requirements are set forth in Rules 110.9 and 110.10. Presumably such specific authorization would be obtained from the AEC, which could make a "determination that such activity will not be inimical to the interest of the United States" [Sec. 57a (3B)]. At the present time, there does not seem to be any other way for a United States citizen to engage in this type of activity, no matter how indirect.

Information Control

The "born secret" system necessarily places a severe obstacle in the path of international atomic



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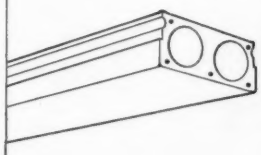

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It gives the architect the overall picture on the use of this system in a one-story, two-story or multiple-story office building, including savings in fireproofing, construction time and materials.

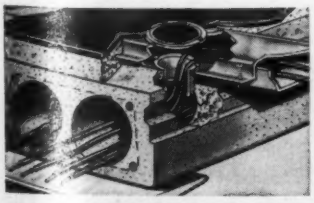
It gives the structural engineer design information on the framing for Flexicore long-span construction, plus typical structural details.

It gives the general contractor information he needs to handle a Flexicore electrified job.

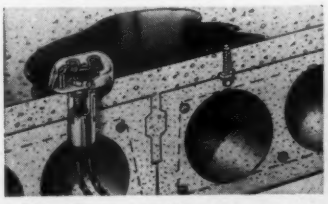
It gives the electrical engineer detailed electrical information about this system and includes typical distribution layouts.

It shows the electrical contractor the step-by-step installation of Conduflor electrical fittings with photos. These fittings are obtained by the electrical contractor from the Conduflor Corp., 3338-G Warren Road, Cleveland 11, Ohio.

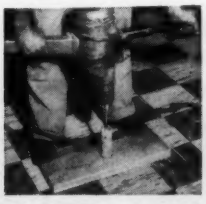
For a copy of this manual, write or phone your nearest Flexicore manufacturer or The Flexicore Co., Inc., Dayton 1, Ohio.



Wiring drops from header duct into cell at handhole junction.



Wiring then runs either way through cell to floor outlet.



To install outlet: drill hole at outlet location.

Next, install fitting in floor and fish wire.

Last, attach electric or telephone outlet box.

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MISSOURI, E. St. Louis, Ill.
St. Louis Flexicore Inc.

NEW JERSEY, Camden
Flexicore Div. of Camden Lime
NEW YORK, Buffalo 6
Anchor Concrete Products, Inc.
NEW YORK, New York 17
Flexicore Precast Inc.

NORTH CAROLINA, Lilesville
W. R. Bonsal Company, Inc.
OHIO, Akron-Cleveland
Lake Erie Flex., Kent, Ohio
OHIO, Columbus 22
Arrowcrete Corporation

OHIO, Dayton 1, PO 825
Price Brothers Company
PENNSYLVANIA, Monongahela
Pittsburgh Flexicore Company
RHODE ISLAND, Saylesville
Durastone Flexicore Corporation

TEXAS, Houston, 4511 Kyle St.
Flexicore of Texas, Inc.
WEST VIRGINIA, Wheeling
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Mid-States Concrete Products Co.
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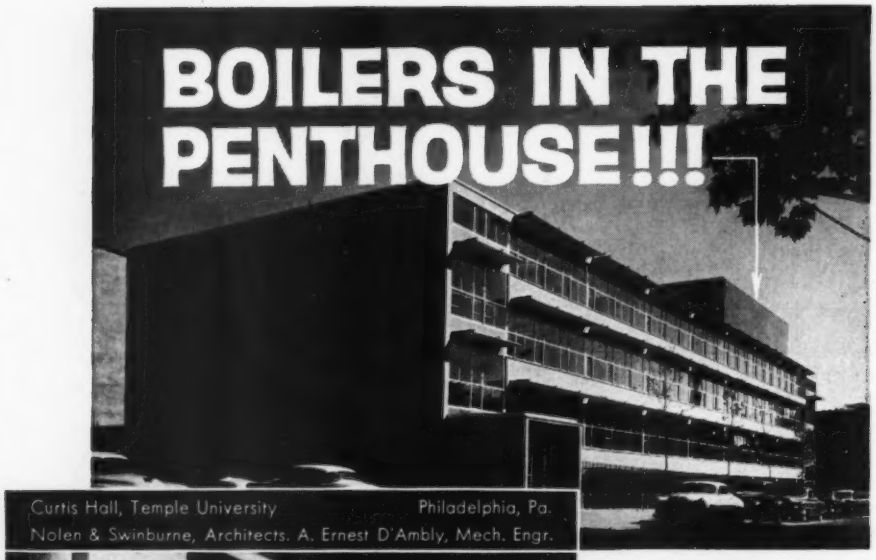
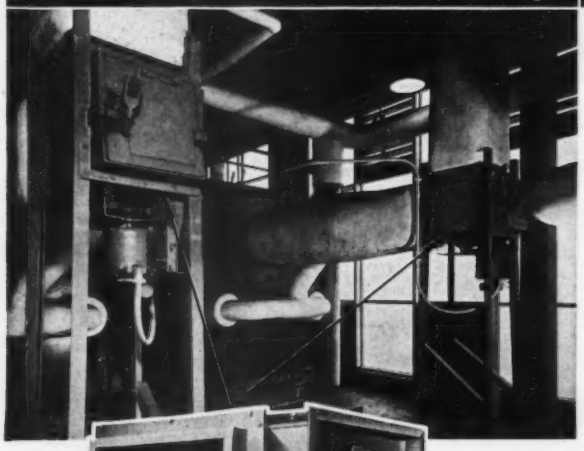
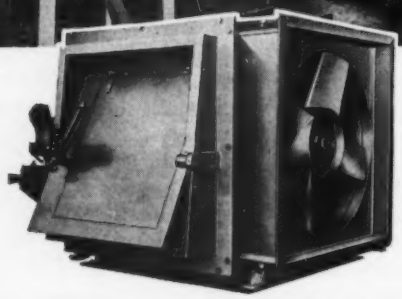


Curtis Hall, Temple University — Philadelphia, Pa.
Nolen & Swinburne, Architects. A. Ernest D'Ambly, Mech. Engr.





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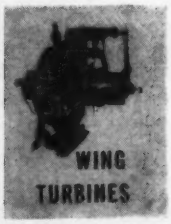

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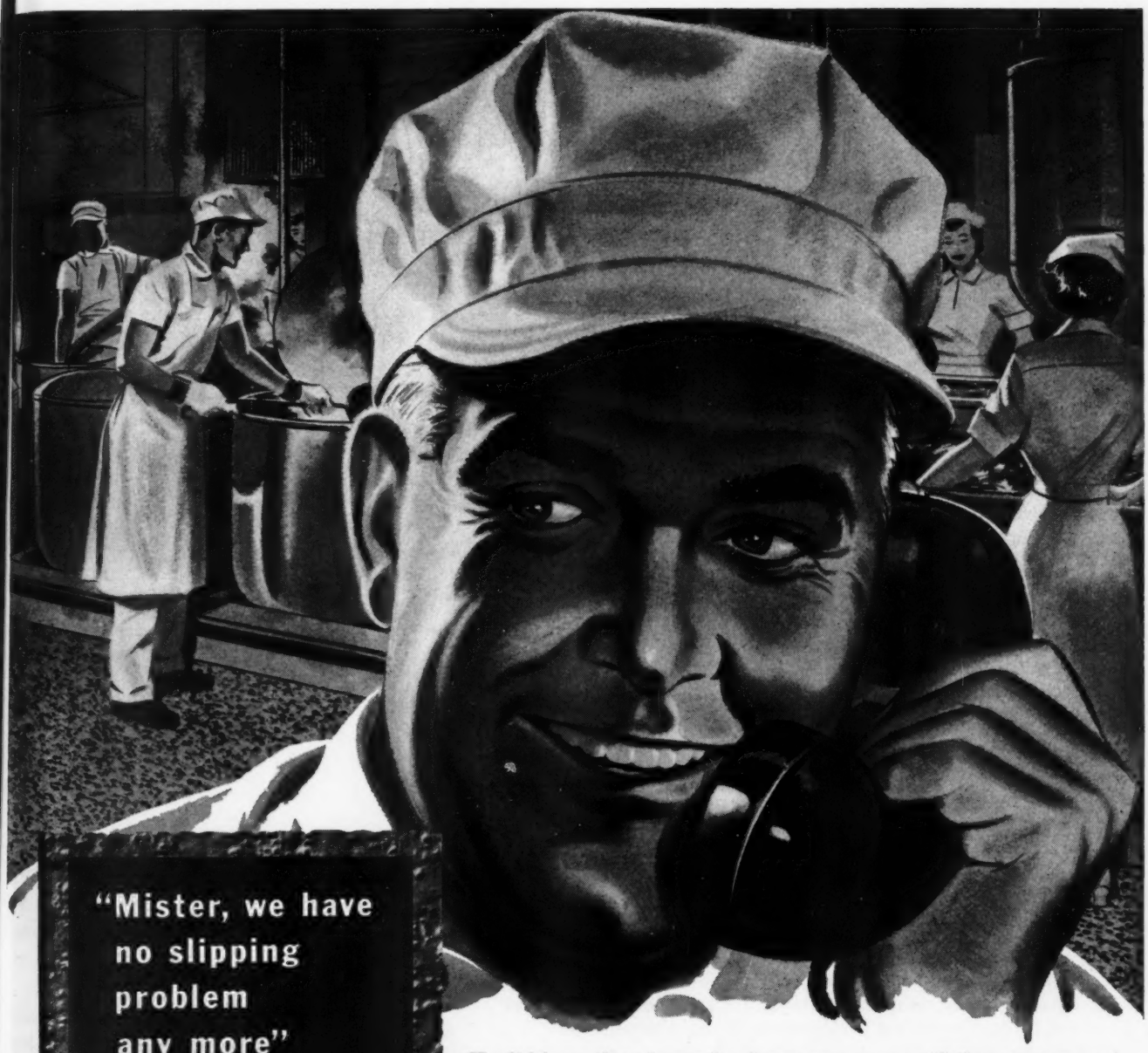
energy business. In addition, it makes it difficult to cooperate properly with the customer, since conversations with him or his employees may be a very tricky proposition, as would be the writing of instruction manuals for the foreign operators.

With Power Bilateral

The power bilaterals (including the one with Australia) permit the exchange of restricted data in conjunction with projected programs under proper safeguards (e.g. Art. II C. 2 and 3 of the Australian power bilateral), and explicitly provide that the individuals can exchange restricted data (e.g. Art. VI B of the Australian power bilateral). Although the 1954 Act does not expressly permit such communication of restricted data, presumably the power bilateral is itself "law" and provides the necessary authority. Thus, the exchange of restricted data with the Australian company should be manageable.

Without Power Bilateral

Insofar as the Indian customer is concerned, the problem is even more complicated. Not only is the 1954 Act silent about communication of restricted data abroad, but there is no other law to help, except possibly Part 110 of the AEC Regulations. Although these rules are law, they cannot enlarge the powers given the AEC by Congress. Rule 110.7 says that there is a general authorization if restricted data is not involved, thereby implying that if restricted data is involved, a specific authorization will permit its dissemination. But Rule 110.8 and following do not expressly permit distribution of restricted data, even though restricted data is mentioned incidentally in Rule 110.9 (1b). This would undoubtedly leave us in a severely nerve-wracked condition, even if the AEC gave us express authority to distribute restricted data to the Indian customer. In fact, I would be afraid to recommend to a client



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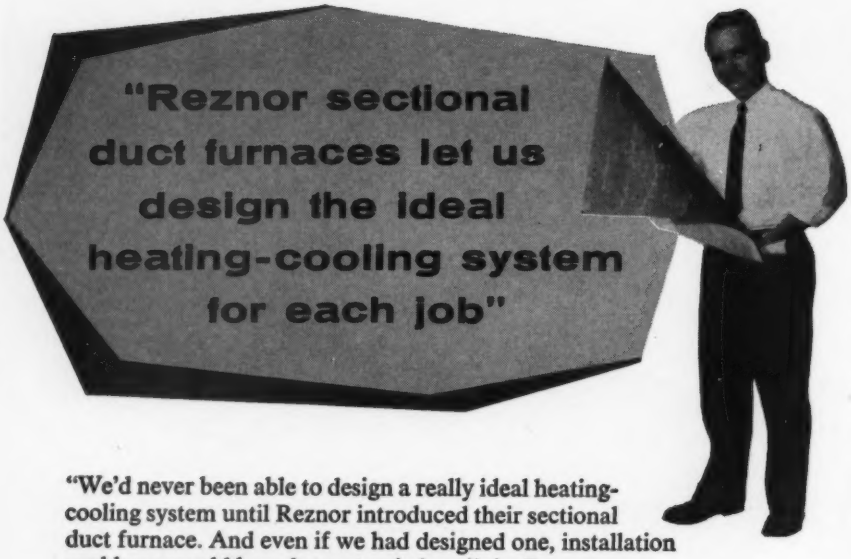

"We'd never been able to design a really ideal heating-cooling system until Reznor introduced their sectional duct furnace. And even if we had designed one, installation problems would have been stymied until the Reznor sectional duct furnace came along.

"Sectional assembly eliminates the installation problems which formerly prevented the use of large capacity custom-engineered duct systems. With the new Reznor DS sectional duct furnaces, we can specify system capacities of two million BTU or more knowing that they can be assembled on the job from sections weighing no more than 315 pounds.

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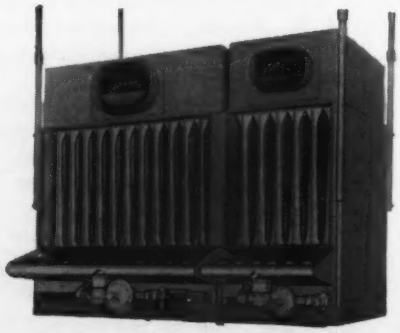
"Reznor sectional duct furnaces are a heating engineer's dream come true . . . and our long experience with Reznor gas unit heaters gives us complete assurance that these new duct furnaces will be tops in efficient performance, dependable service and long life, too."

If you're not taking advantage of the design freedom these new units offer you, you're really missing something. Write today for free catalog or call your nearby Reznor distributor for details. You'll find him listed under "Heaters-Unit" in the yellow pages of your telephone directory.



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that he disclose any restricted data to an Indian customer unless and until there is an Indian power bilateral or a change in the Atomic Energy Act. Certainly, to be on the safe side, I would at least insist that any Indian person receiving restricted data must be first cleared by the AEC. But even so, I would be afraid to permit such disclosures, since we have no control over what he will do with the information.

Licensing and Export-Import

It will, of course, be necessary to make sure that our licenses permit us to export the reactor or reactors when built. Thus, Sec. 101 of the 1954 Act provides: "It shall be unlawful . . . for any person within the United States to . . . export any utilization . . . facility except under and in accordance with a license issued by the Commission pursuant to Section 103 or 104."

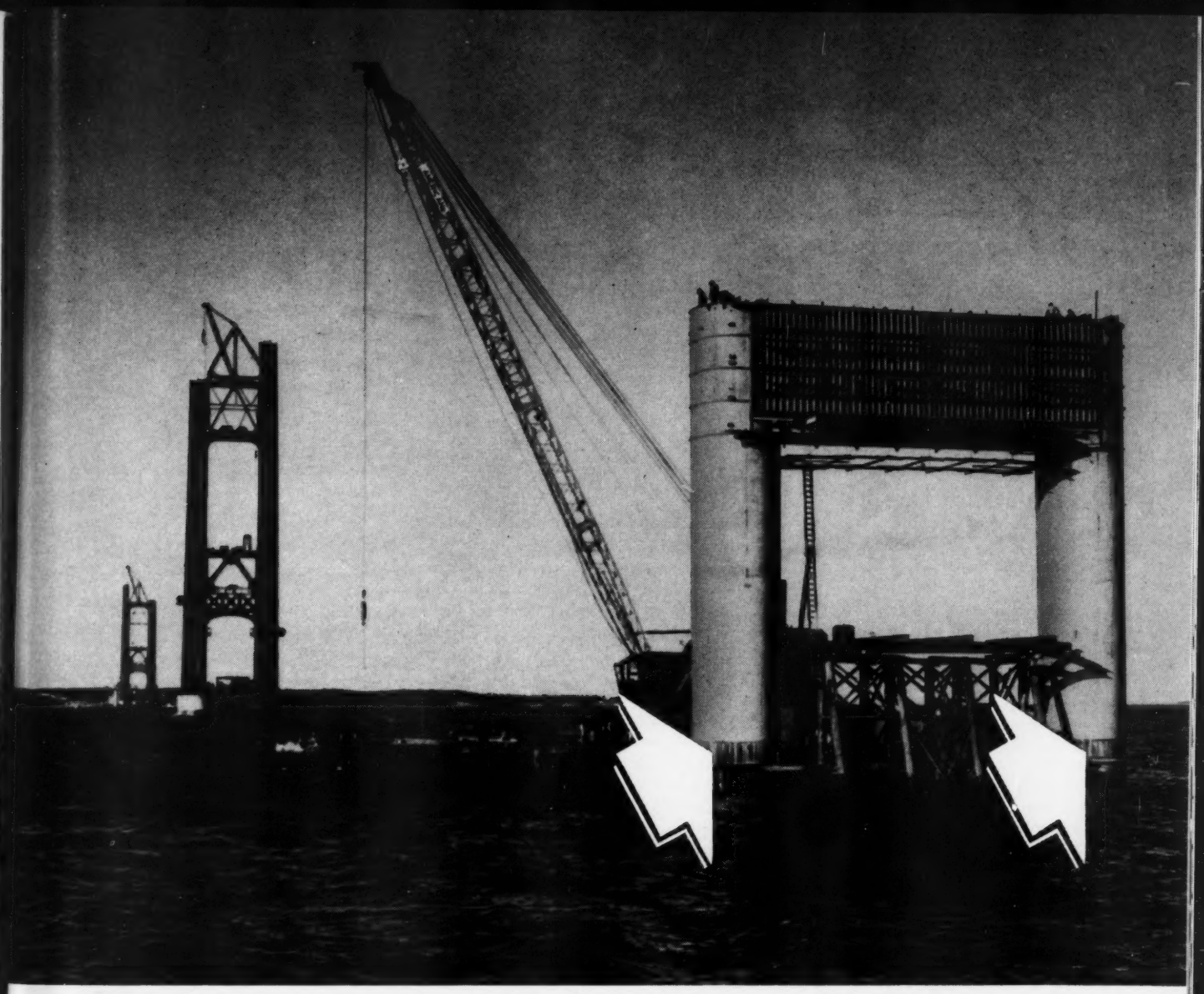
We may also require "component part" licenses, if the reactor is to be exported piecemeal (Sec. 109, 1954 Act).

In addition, regular export licenses also will be required.

Obtaining Nuclear Materials

If the customer can obtain special nuclear materials from his government (e.g. Australia, under the power bilateral, or India under a future power bilateral or under the future international agency, when ratified), there will be no problem on this score. The former method is in accordance with Sec. 54 of the 1954 Act, and the latter with Sec. 121. Under Sec. 57a (2) an individual cannot "export. . . from the United States any special nuclear material," so that in any event the customer will apparently have to get his material from his government. If this material is too low in U-235 concentration for our reactor design (as is quite possible), we are completely sunk, and had better abandon the project.

We may also have to look out for Sec. 52, which provides that



World's longest suspension bridge stretches four miles across the Straits of Mackinac joining Michigan's upper peninsula with the rest of the state.

Wrought Iron Plates protect Mackinac Bridge pilings against corrosion and spalling

Welded wrought iron plates extending ten feet above and eight feet below the waterline, form a bulwark of protection against corrosion and ice.

Engineers on the $100 million Mackinac Bridge faced this problem: what material could most economically protect the bridge's concrete substructure against recurrent wet-dry corrosion and abrasion by ice?

Consulting Engineer D. B. Steinman, New York, met these requirements by specifying over 270 tons of ⅜-inch wrought iron plates. These plates do double-duty . . . combatting corrosion and guarding pilings against stress and subsequent spalling under dense ice formations.

Wrought iron can cut maintenance costs in your installation, too. Our booklet, "Wrought Iron for Bridge Construction," tells you how and why. Write for a copy.

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Corrosion costs you more than Wrought Iron

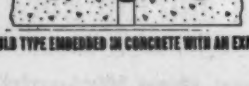
How to Choose Waterstop for optimum performance in concrete joints

Basic Design And Resilience Most Important Factors

The principal function of waterstop is to keep concrete joints watertight where hydrostatic water pressure is present. To be effective, and to perform its function under widely varying conditions, the waterstop must:

1. **Be designed in such a way that it will maintain a "pressure seal" when the joint is opened up or compressed, or when hydrostatic pressure is exerted against it.**
2. **Be made of a material that is inherently stable and resilient...that will retain its resiliency and strength under wide ranges of temperature.**

There is general agreement by many governmental and private specifying authorities, after years of testing and actual installation, that the dumbbell design of waterstop (below) is mechanically superior to any which has been developed to date. The design provides a self-sealing action, because as the concrete contracts and the joint opens up, the outer edges of the dumbbell bulbs become more tightly engaged with the concrete, insuring a tighter seal as the tension increases, due to movement either in the joint or increasing water pressure on one side of the joint. In effect, the greater the longitudinal pull or pressure on one side, the more tightly the dumbbell ends are pulled and squeezed against the concrete. The simpler dumbbell design of the rubber waterstop allows full strength and contact with the concrete surrounding the waterstop. The larger design also provides for maximum strength to resist higher pressures on the web of the waterstop across the joint opening.



6" DUMBBELL TYPE EMBEDDED IN CONCRETE WITH A CONSTRUCTION JOINT

9" HOLLOW BULB TYPE EMBEDDED IN CONCRETE WITH AN EXPANSION JOINT

Rubber and vinyl are the most commonly used waterstop materials. For the majority of applications, rubber is the most satisfactory material. Being a thermosetting material, rubber is more resilient and "live"...will maintain a constant pull against the retaining edges (bulbs) as the joint opens up or water pressure increases. Vinyl is a thermoplastic compound and tends to take a "set" after it has been stretched, will float in the joint cavity, and have less resistance to the passage of water. When higher temperatures are present, such as in oil storage tanks, where oil is kept at temperatures around 150°F., the vinyl material, unless specifications are rigidly written, will soften and lose strength, causing a failure of the waterstop.

Field Splicing of Dumbbell Type

Servicised Products Corporation has developed a new Union which provides a simple method of joining the ends of dumbbell waterstops, making it just as fast and easy to field splice rubber and neoprene waterstop as the joining of the polyvinylchloride types.

The Union is made in the same cross-section, and from the same material as the waterstop. It is hollow, except for a solid web at the center. After adhesive is applied to the waterstop ends, they are inserted in the Union and pushed against the centering web. The splice is then clamped together until the adhesive has set. This completes the splice.

Dumbbell type rubber and neoprene waterstop are fully described in a special Waterstop Circular available from Servicised Products Corporation upon request. The Union and an interesting new development, Split Type, are also illustrated and described in the circular. Write for it today.

SERVICISED PRODUCTS CORPORATION
6051 W. 65th Street, Chicago 38, Illinois

all special nuclear material "under the jurisdiction of the United States" shall be the property of the United States (even though it originated elsewhere, apparently). There is therefore a question of whether our foreign customer could safely be a subsidiary of our corporation (and hence under U. S. jurisdiction).

Even though the foreign customer is not under U. S. jurisdiction, we may have to do some very heavy worrying about Rule 50.54.: ". . .the following shall be deemed conditions in every license issued: (a) Title to all special nuclear materials . . . produced by facilities pursuant to the license shall at all times be in the United States." Presumably this should not apply to a facility that has been exported from the U. S. and contains no special nuclear material supplied directly by the United States, but it does not say so (unless this can be implied from Sec. 54 of the 1954 Act, where there is a power bilateral, or from the Statute of the International Agency). ▲▲

ARTICLE REPRINTS

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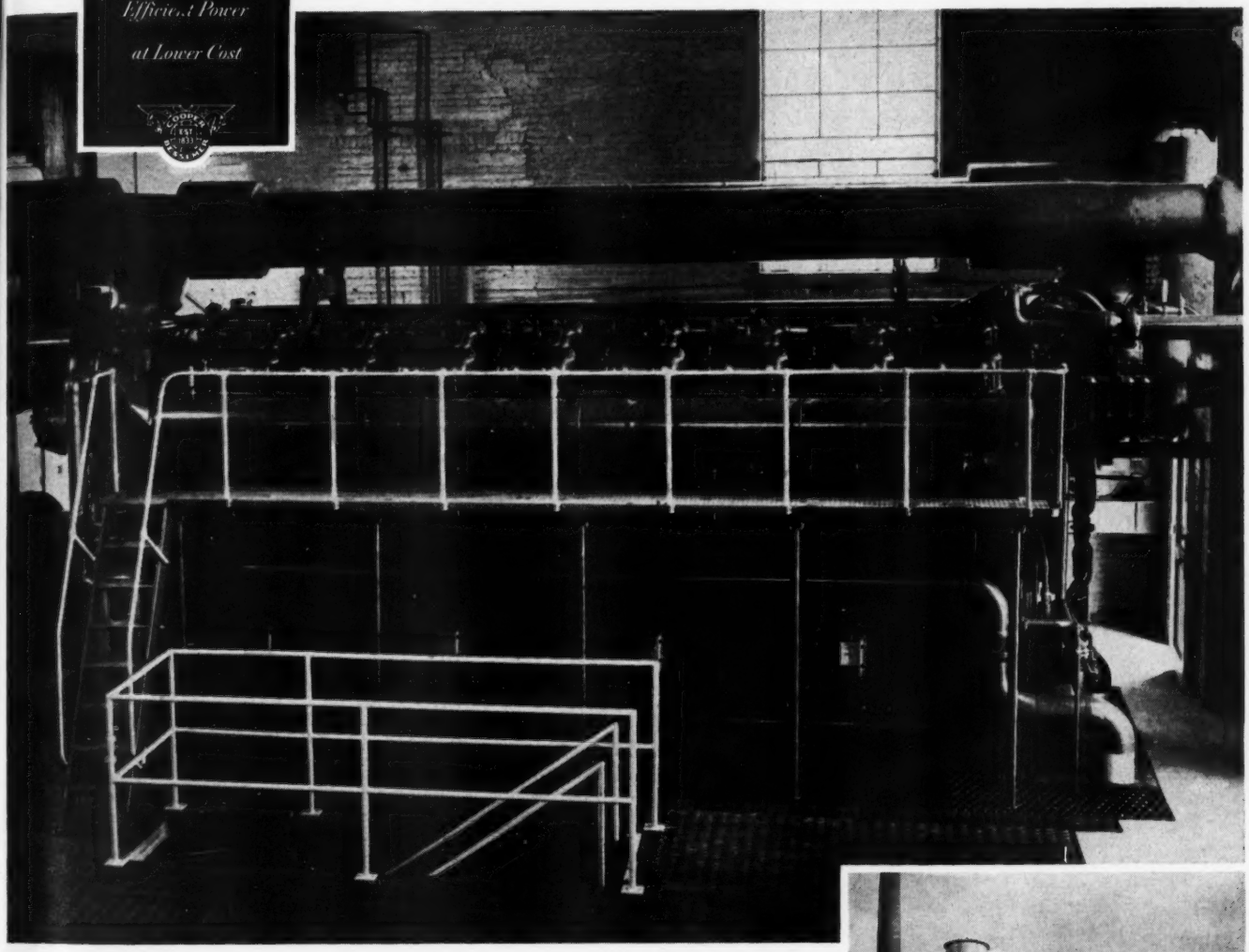
Another Example of Efficient Power at Lower Cost

There's a lot of dependable horsepower packed in this 16-cylinder turbocharged Cooper-Bessemer LSV Gas-Diesel. In operation at the Princeton, Illinois municipal power plant, this unit delivers 3,600 hp at 327 rpm.



How Cooper-Bessemer Solved A "Growing" Problem at Princeton Municipal

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Selection of this engine was based primarily on three important Cooper-Bessemer advantages. First was extreme flexibility for continued, low-cost power generation. With the supply of natural gas limited during certain months, the engine can easily be switched to straight diesel fuel or any fuel combination as supply dictates.

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METAL-CLAD SWITCHGEAR

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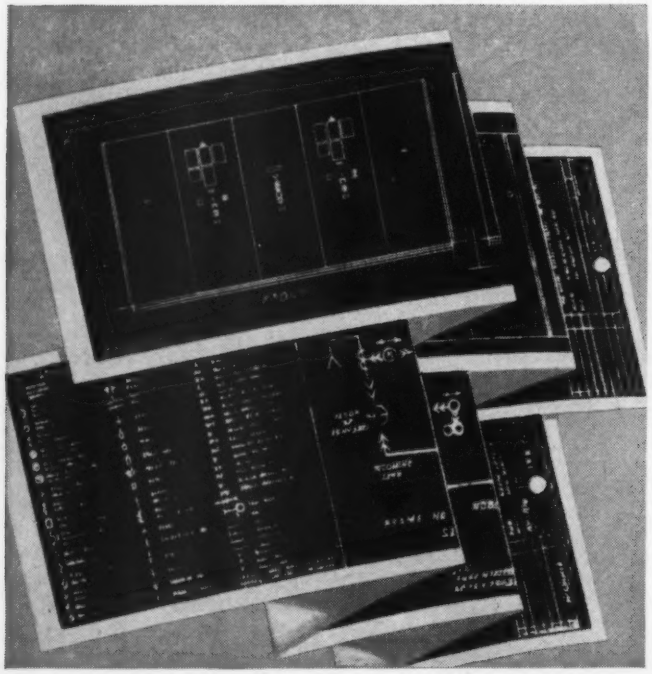
I-T-E pre-engineers your installation before shipment... eliminates last-minute on-the-job fitting of switchgear to channel base



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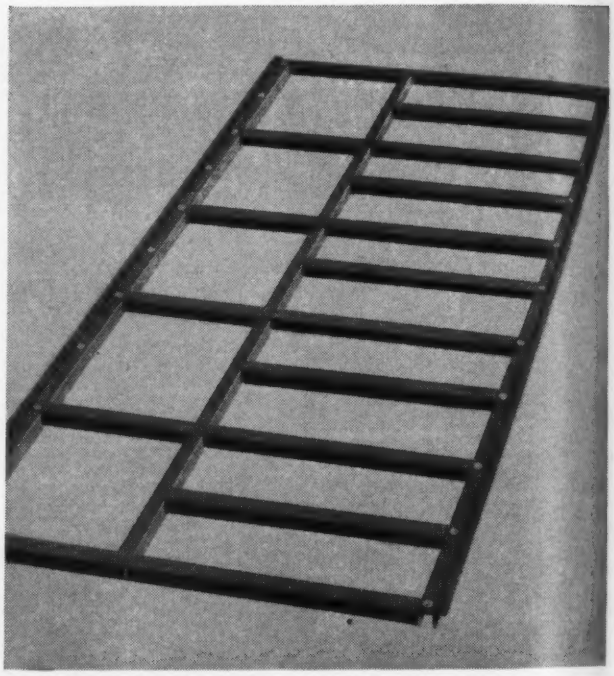

2. Prefabricated, painted channel base delivered first. Shipped upon request, well ahead of other equipment. Foundation bolt holes are pre-drilled to align with holes in switchgear housing.

Long before delivery of your I-T-E Metal-Clad Switchgear, you begin benefiting from the preliminary engineering and construction work which is a part of I-T-E's service to customers. It's another extra assurance of dependable performance you can expect from I-T-E equipment.

Floor plan, outline and single line drawings are supplied well in advance. Hence conduit can be run, floors poured, channel base set in place, and cables pulled. The switchgear, when it arrives, can be moved into position and connected according to plan quickly—saving you many installation hours on your premises.

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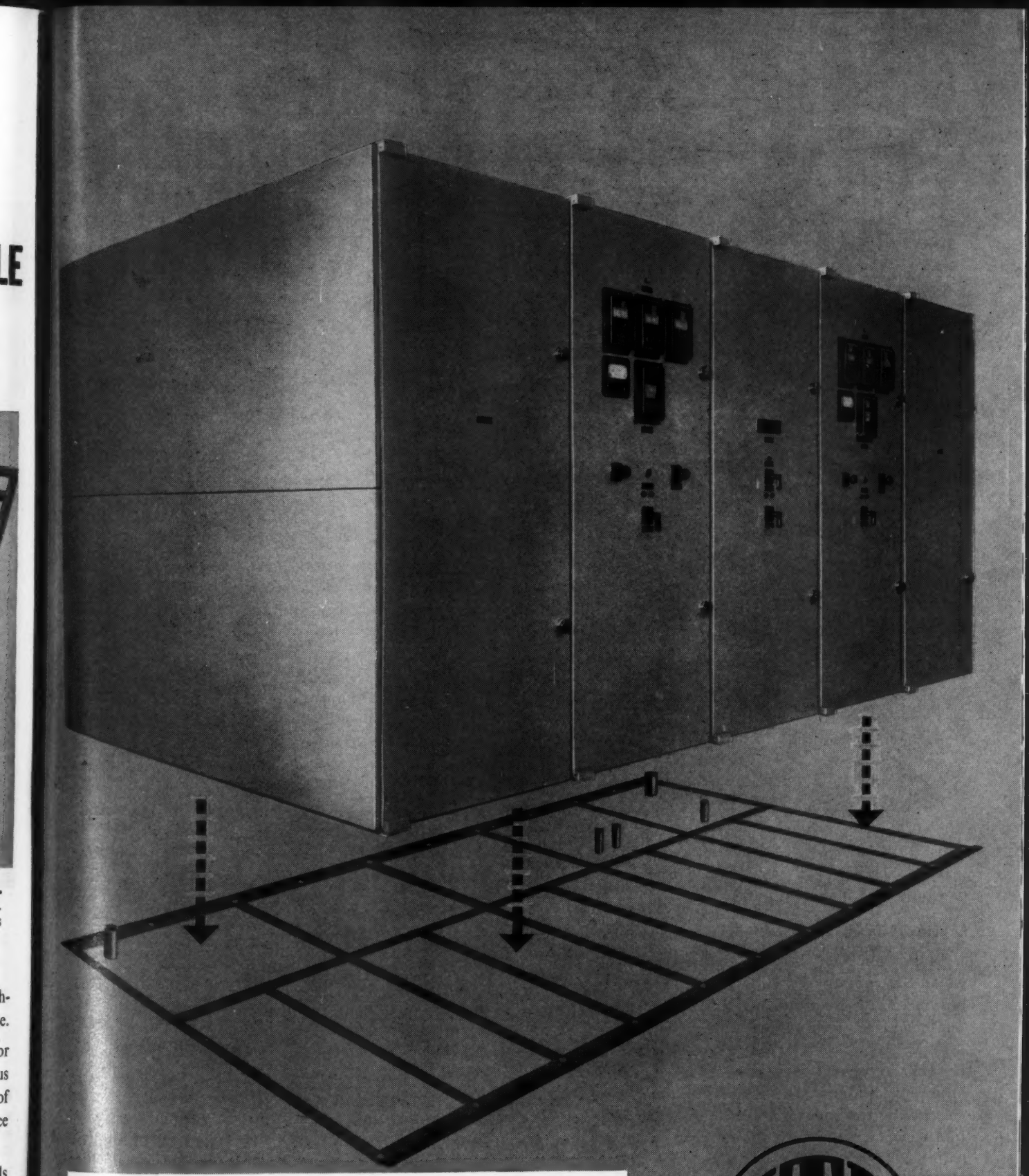

3. **Sure fit—no delay.** Channel base is embedded into the floor first. Then when switchgear is delivered it can be installed immediately. Sturdy I-T-E housings can be lifted in one piece by toe jack or chain hoist without distortion.

I-T-E

Report from the West Coast

RALPH S. TORGERSON
CONSULTING ENGINEER CORRESPONDENT

GOVERNOR KNIGHT'S signing of California Senate Bill 1084, points up the entire subject of hiring students for engineering work. The bill, now in effect, exempts minors over 16 years of age from the restrictions of the 8-hour labor law if they are working for engineers and are engaged in surveying as part of a surveying crew. This amendment to the Labor Code permits students to work on survey crews in excess of 8 hours per day during summer vacations.

Hiring high school and engineering school students for the summer months has helped to relieve the work load on the professional staff of West Coast consulting engineers. Another source of help in the present shortage of engineers is the employment of women for technical jobs.

Engineers' Opinions

To get an expression of opinion on the subject, consulting engineers were asked to give their experience with employment of students and women. Some typical views follow:

D. C. Wolfe of Sverdrup and Parcel, Inc., San Francisco, reports very satisfactory results with engineering students. He said, "Our firm has pursued this policy for several years to good advantage. We feel it to be helpful to the student in giving him a sounder idea of engineering practice and in determining the lines along which he may wish to concentrate. He also becomes acquainted with us and is very apt to apply for permanent employment upon graduation. In some instances we have employed students for several summers and even during Christmas and other vacation periods. If we have the work, we find them to be good investments because we already know their worth and abilities."

Regarding women engineering graduates, Mr. Wolfe said that occasionally there is an applicant for an engineering position such as designer or hydraulic engineer. "More frequently," he said "women apply for positions as draftswomen in which they many times excel. We have two draftswomen now and would employ more if they were available."

John W. Cunningham, of John W. Cunningham & Associates, Portland, Oregon, is very satisfied with student employees. "We have for many years, going back to a time when there was no shortage of engineers, employed students for summer work on field parties. We have employed hundreds of high school students as rodmen and chainmen. We have found them active and interested in their work."

On the question of employing women in engineering capacities, Mr. Cunningham said, "We have no objection to women for drafting room work, however, it is our feeling that the current shortage of employees will not go on forever. We doubt if there is a great future for women in engineering."

B. W. Goodenough, of Tudor-Goodenough Engineers, San Francisco, reported that the employment of engineering students was particularly advantageous on construction supervision work. He said, "During the summer of 1956, we employed three such students — one on each of our jobs. Although their duties and responsibilities varied because all three jobs were different, we found all of them to be definite assets to the organization. We would have welcomed any of the three back this summer had there been a spot to utilize them. However, with the Tri-Dam project nearing completion, we were not able to place them.

"I definitely feel that the engineering student can be used to good advantage in construction work because their vacation period coincides with the normal peak season. They can be used effectively in the field office, in the concrete or soils laboratory and as assistant inspectors. It is believed that the practical

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training derived is of value to them in subsequent school years and leads toward a better class of graduate engineers. Such part-time employment is definitely a help in future recruitment and should be so considered by firms such as ours. Even if the individual goes with another firm, the profession as a whole benefits."

Mr. Goodenough reported his company had no experience with women engineers. He expressed the view, however, that other than in the field office, there appears to be no place for women in an organization like his firm which deals primarily in engineering supervision of construction.

Thomas E. Taylor, consulting mechanical engineer, Portland, Ore., feels that there are some possibilities of obtaining future additions for his permanent staff but takes a dimmer view of the advantages of short-time employment of students. On the other hand, Mr. Taylor has found the employment of women engineers and draftswomen very satisfactory. "I feel that the average engineering school graduate is of no great use in an engineering office during the first six months of his employment. It takes that much time to induce him to use his education as a tool, to develop his imagination, and to impress upon him that, despite the shortage of engineers, he is not indispensable and that engineering, as a business venture, expects 'a day's work for a day's pay.'

"I see no logical reason to employ undergraduates for a period of three months or less, after which time my chances of obtaining their permanent association after graduation are based, not on the experience that I afforded them, but on the starting salary and the extent of fringe benefits.

"My attitude may give the impression that I have become cynical of formal engineering training. This is far from the truth. I do feel, however, that engineering students should be impressed with the fact that while their serv-

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dramatic lighting helps set your "theme"

Famous Cordette Casuals by Moe Light can create many moods — in this interior, they add a gracious look to the dining area, while lending an air of informality to the bar.

(Fixtures shown: M-1427 3-Lite cluster in main dining area; M-1437 "3-in-line" accents the wall; M-1421 cones over bar.)

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Johnson March

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ices are sought, they are still expected to assume responsibility of learning true engineering from the ground up.

"Concerning women engineers, in certain cases I prefer them to men. At the present time I have in my employ one draftswoman doing an excellent job. Several years ago, I employed two women mechanical engineers and found that they did their jobs well, they were extremely sincere and cooperative, and each showed an admirable characteristic of staying with a project despite adverse conditions until it was completed. Assuredly, I would hire women engineers if they were available and met my qualifications."

Dudley Deane, of Dudley Deane and Associates, San Francisco, thought so well of the idea of employing engineering students that the services of an industrial relations consultant were retained to interview students. This man performs this service for several of the smaller firms not in the consulting engineering field who employ engineers of all categories. These firms are not otherwise in a position to interview students and compete with the large corporations with a permanent recruiting staff. "We found the results very satisfactory," said Mr. Deane, "and well worth the fee paid to the consultant. Some of these students are employed by us during summer vacations and some as part-time draftsmen during the latter half of their senior year. These become full-time employees upon graduation.

"Women are also used for drafting. We find that in certain work, such as plumbing, process piping, and electrical layouts, some of them are more thorough and patient with details than the men, who at times lose interest in this type of work. Some of the women are experienced before coming to our firm, but others are trained by our engineers, starting as tracers."

John A. Blume, of John A. Blume and Associates, San Fran-

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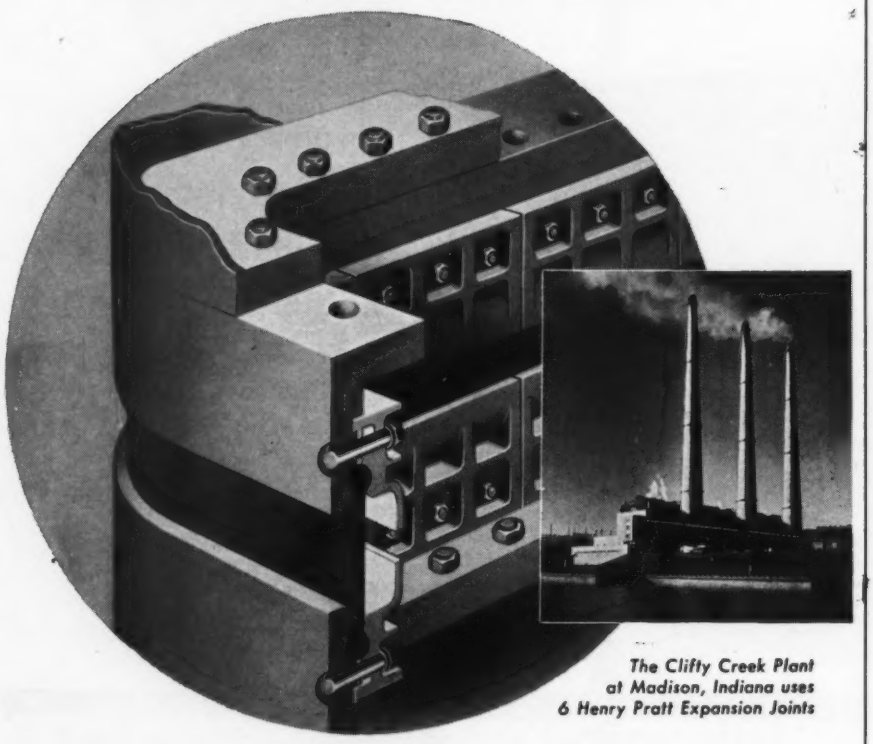

The Clifty Creek Plant at Madison, Indiana uses 6 Henry Pratt Expansion Joints

This expansion joint insures Turbine-Condenser alignment

The size and complexity of modern power plants have made it very difficult to foresee all the problems involved in mounting condensers and turbines. Often the final piping engineering is not completed until after the units are installed. By using a rubber belt expansion joint between the turbine and condenser, both the engineering and the construction are greatly simplified. Construction tolerance can be held to reasonably obtainable values because the expansion joint will absorb up to one inch of axial and one-half inch of lateral movement.

Any shape or size . . . Round or rectangular shapes can be built without size limitation . . . if one dimension is less than 14'9" the joint can be shipped fully assembled, a great convenience to installation. Connections for welding, bolting or combinations such as landing bar and weld can be supplied as needed.

The Henry Pratt Company offers complete engineering and manufacturing facilities for exhaust stacks and joints, flues, ducts, butterfly valves and other power plant equipment.

Write for this detailed folder, discusses Turbine-Condenser connection methods as well as detailing the Henry Pratt Expansion Joint
Ask for Bulletin—

HENRY
PRATT

TURBINE-CONDENSER
Expansion Joints

Henry Pratt Company, 2222 S. Halsted St., Chicago 8, Ill.

cisco, reported that his firm often employed students during summer vacation periods. High school boys have been employed as office boys and tracers, some of whom developed an interest in engineering and later attended college. College students have been used as part-time workers, particularly in post-war years.

"I would not say that this has developed our permanent staff," he said, "to any marked degree. Only about 10 percent stayed on or returned. The reasons for this are many, usually a matter of where they want to live and military service requirements. In general, the supervision required makes these boys of little economic value unless they do develop and stay. However, we are glad to help them out all we can.

"We have not as yet employed women in our technical work. It is difficult for them in our activity where a certain amount of field work is desirable as an aid to design. We are not opposed to them if they and the rest of the force can forget they are women, and they are treated as designers or engineers. It is an individual problem."

Washington Legislative Victories

Several victories were chalked up by the Consulting Engineers Association of Washington during the recent session of the state legislature. In cooperation with other engineering organizations and the AIA, Senate Bill 379, which would have authorized the State Board of Education to prepare and use stock plans for school buildings, was defeated. Senate Bill 243, which would have permitted any corporation to engage in the practice of engineering provided one licensed engineer was in its employ, also was defeated.

Washington is among the few states that does not permit engineers to incorporate. Secretary C. M. Barr of the Consulting Engineers Association of Washington, explaining the action taken on

Senate Bill 243, said that the Association is not opposed in principle to the idea of permitting engineers to incorporate, but the form in which S.B. 243 was presented was objectionable. To this end, the Association has appointed a committee to study the matter and prepare a bill, with suitable safeguards, for submission to the next session of the legislature in 1959.

The Washington Association has been working with the Consulting Engineers Association of Oregon to have the Bonneville Power Administration effect changes in procedure for retaining the services of engineers. The present directive requires the chief engineer to follow a plan which is essentially competitive bidding. Several meetings have been held with Mr. Starr, the chief engineer, who was very sympathetic, but under the present setup his hands are tied.

Making a Profit

Wm. W. Moore, of Dames and Moore, San Francisco, led a discussion at a recent luncheon meeting of the Consulting Engineers Association of California. The subject was: accounting for a principal's time in connection with his engineering business. He enumerated the duties and activities of a principal that are not normally a direct charge against a specific job, yet should be taken into consideration in determining the annual profit or loss of the business.

He cited as an example an engineer with nine employees and an annual gross income of $100,000, who will pay out in payroll costs $60,000, another $30,000 in expenses (not including anything for himself), which leaves $10,000 taxable income. However, if the engineer includes a salary for himself of $12,000 per year and takes into consideration a capital dividend of $3500 (10 percent of capital invested in the business, including working capital) he will find that instead of making a profit during the year, he will wind up with a loss of $5500. ▲▲

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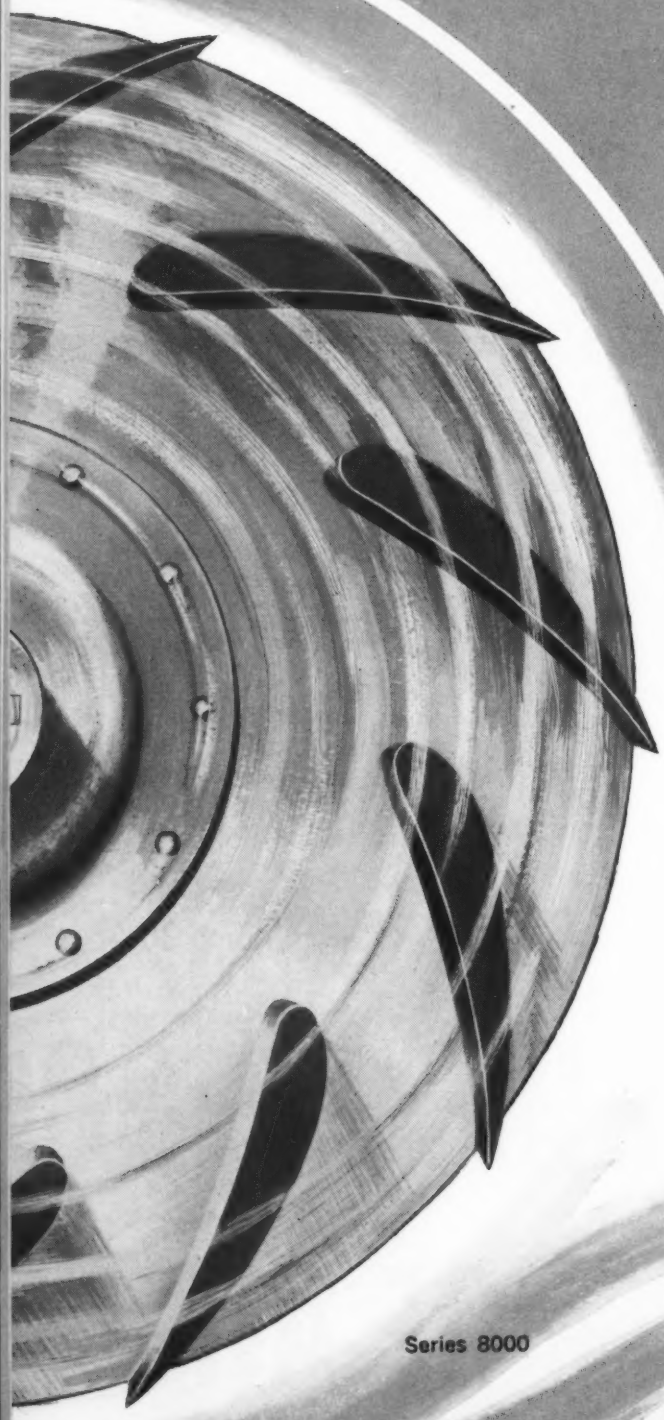

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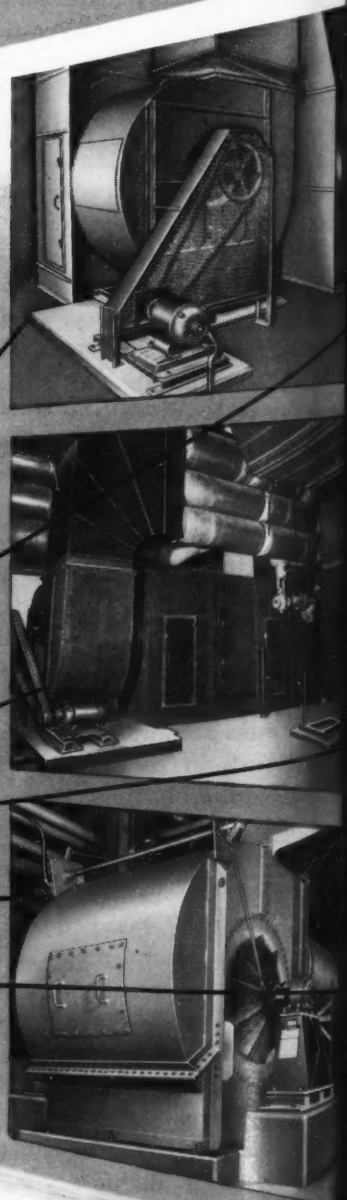

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Atoms in Action

STUDIES COMPLETED by General Motors Corp., Ford Instrument Co., and General Atomic on the feasibility of gas-cooled closed cycle nuclear propulsion systems for ships have been so encouraging that the AEC and the Maritime Administration have extended an invitation to industry for proposals to develop a nuclear power plant for merchant ships using a gas-cooled reactor coupled with a closed cycle gas turbine. This is in addition to work now underway on development and construction of a merchant ship powered by a pressurized water reactor. Preliminary design of this first vessel is completed and a contract for its construction is scheduled to be awarded in the next few months.

NOTICE that it proposes to issue developmental power reactor license No. 1 to General Electric Co. for operation of a power reactor in Alameda County, Calif., has been filed by the Atomic Energy Commission. The facility is a boiling water reactor that GE expects to operate initially at a thermal power level of 20,000 kw, furnishing heat for production of 5000 kw of electricity.

"CORROSION AND WEAR Handbook for Water Cooled Reactors," 293-page book, the sixth in an unclassified series on reactor technology sponsored by the Naval Reactors Branch of the AEC's Division of Reactor Development, gives solutions of engineering problems resulting from use of water as a heat transfer medium in a reactor plant. The data in the book is based on experiences in the development of the Nautilus and the Shippingport projects. Cost is $2.25 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

INCREASED USE OF TRITIUM in tracer studies can be expected to follow the discovery at Argonne National Laboratory that organic compounds can be labeled with this radio-active hydrogen by exposure to tritium gas. Materials of complex or unknown structure can be labeled easily by this method, and concentrations of the tritium analyzed after million-fold dilution. Simplicity of the technique and its low cost make its large scale use in industrial research probable.

A TWO-STEP atomic energy program has been formulated by the Union of Burma Atomic Energy Center, based on recommendations of Dr. Richard F. Humphreys, assistant director of Armour Research Foundation. The first phase will be a two-year program with a nuclear laboratory equipped to handle radioisotopes for use in research. The second phase includes establishment of a reactor laboratory to supply radioisotopes for research and training, radiation in the form of neutrons and gamma rays for research, and training in operation and maintenance of nuclear reactors. The laboratory will have facilities for 20 to 30 scientists and engineers and their staffs. The program is expected to produce 15 to 20 qualified technicians annually.

A REINFORCED BRICK SCHOOL structure successfully withstood the effects of an atomic explosion during the 1957 Plumbbob nuclear test series. Large enough for a typical class of 30 pupils, the building was one of the five structures designed by the Structural Clay Products Institute to evaluate new reinforced brick and tile wall designs. In addition, six walls of brick and tile in two other structures and two roof structures of reinforced clay tile beams came through the tests without visible damage.

TO AID IN DEVELOPMENT WORK on a nuclear propulsion system for aircraft, General Electric engineers have designed what is probably the world's longest periscope for use at the Idaho Falls, Idaho, National Reactor Testing Station. The 90-ft aluminum tube, with an intricate mirror and lens system, permits workers to sit safely behind heavy shielding while watching performance of a reactor under test.

THE ITALIAN government and the World Bank will cooperate in sponsoring a study leading to construction of a large nuclear power station in southern Italy. To be known as Project ENSI (Energia Nucleare sud Italia), the study will include selection of a site for a nuclear power station; preparation of invitations to qualified manufacturers on an international basis to tender for a nuclear plant of approximately 150,000-kw capacity; and a review of tenders submitted and preparation of an evaluation, particularly regarding comparative cost and performance. The U.K. Atomic Energy Authority and the U.S. Atomic

ALL IN A DAY'S WORK AT *Pittsburgh Piping*

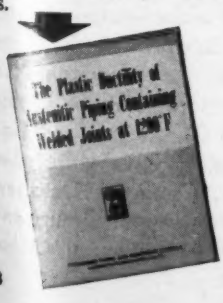
THE FIRST PIPING FOR ATOMIC POWER

Fabricated section in foreground is austenitic steel piping—the first fabricated for the world's first big atomic-power central station. Other components of this system are shown at the right.

This piping is a record maker—being the first ever made for a big atomic-power plant—the Duquesne Light Shippingport station. This job, while challenging, was facilitated by employing the techniques which we had previously developed for fabricating austenitic steel piping for central stations operating at steam temperatures of 1050°F. and higher, as well as for the *Nautilus*. In fact, Pittsburgh Piping was among the first to fabricate stainless steel piping—for the process industries, in 1927. And, we pioneered the use of stainless steel piping materials in the power field. We have the experience and the facilities—use them on your high temperature, high pressure piping jobs.

FREE TECHNICAL BULLETIN ON PIPING MATERIALS

This bulletin reports an intensive investigation into the problem of main steam piping materials and gives data on the stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints.



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Energy Commission will provide engineering consultation to the Project. The World Bank will set up an international panel of specialists in the field of nuclear energy and engineering to give guidance to the project and to review tenders and reports on them provided by the U.K., the U.S., and the project staff.

IF YOU PLAN a camping-out vacation this fall, you need the AEC's revised edition of the handbook for uranium prospectors, "Prospecting for Uranium," available from the Superintendent of Documents for only 75¢.

ON THE RESEARCH REACTOR front, AEC has filed notice of proposed issuance of a permit to General Dynamics Corp. for construction of an experimental nuclear facility near San Diego, Calif., consisting of an experimental building and a control building. To be built at Torrey Pines Mesa, on a 290-acre site, the facility will be used primarily for testing reactor cores at near zero power levels. Another proposed construction permit will go to Curtiss Wright Corp. for a pool type research reactor, at Quehanna, Pa. This reactor is to be housed in the Radioactive Materials Laboratory building on the company's 51,000-acre tract. To be operated at a power level of 1000 kw, the reactor will be used for an experimental program including shielding studies, reactor component and instrument development, investigation of radiation damage, neutron physics, and isotope production.

PERFORMANCE TO DATE of the Experimental Boiling Water Reactor at Argonne National Laboratory, which began its first extended full power tests in February, indicate that it probably can produce satisfactorily twice the design reactor power of 20 megawatts (heat). A further increase in power may be obtained by forced circulation of the coolant. Future operating plans call for substituting heavy water for the light water now used as coolant and moderator.

JOINT RESEARCH efforts of the U.S., England, and Sweden have led to discovery of a new element — element 102. The ultra-heavy element was found by bombarding curium (element 96) with carbon ions accelerated in the cyclotron at Nobel Institute of Physics, Stockholm. With a probable atomic mass number of 253, it is very unstable, having a half-life of about 10-12 minutes, and emitting alpha particles.

RADIATION SENSITIVE glass developed by the Naval Research Laboratory glows bright orange under ultraviolet light after it has been exposed to a certain amount of gamma or X rays. As clear as ordinary window glass, the new material is made by dissolving silver into a melt of high phosphate-content glass. Its special qualities make it useful as a detection device for persons working with nuclear materials. In the form of a thin needle it can be used to record amount of radiation received in hard-to-reach tissue of cancer patients.

AEROJET-GENERAL CORP. will present to the University of Akron a portable, low power atomic reactor for use in research. Known as the AGN 201, the reactor is manufactured by A-G's Aerojet-Nucleonics division. With announcement of the gift, the Atomic Energy Commission reported that it would publish a notice of intent to issue an operating license to the University so that the reactor could be put in use for the fall semester.

THE BLIND RIVER district in Ontario, Canada, which now accounts for the bulk of Canadium uranium ore reserves, is probably the largest potential producer of uranium in the world. It has been estimated that total capital expenditures to bring into operation 11 mines — of which four are now in production — will exceed $250 million, not including cost of establishing the townsite of Elliot Lake, which is being laid out for a population of 25,000.

AEC has filed notice of the proposed issuance of a permit to Yankee Atomic Electric Co., of Boston, Mass., for construction of their pressurized water reactor at Rowe, Mass. A license for operation of the reactor will not be issued until pre-operational tests prove that final design gives reasonable assurance that health and safety of the public will not be endangered. Earliest estimated completion date is December 1959, the latest date June 1961.

THE COMMISSION also has approved as a basis for contract negotiations the proposal of the Northern States Power Co., of Minneapolis, Minn., to design, build, and operate a boiling water reactor power plant which would incorporate large volume controlled recirculation of the water coolant-moderator. This plant would be scheduled for completion in June 1962.

A TECHNICAL ASSISTANCE agreement has been reached by Westinghouse Electric International Co. and Belgium's largest electrical manufacturer, Ateliers de Constructions Electriques de Charleroi. The agreement opens the way for ACEC to manufacture nuclear reactors of the pressurized water type, as well as other non-military types developed by Westinghouse. It provides for detailed design and manufacturing information for complete nuclear reactors for land, marine, and aviation use, including fuel elements, reactor cores, and other auxiliary apparatus and special materials.

TO ASSURE WIDE DISTRIBUTION of its study, "Financial Protection Against Atomic Hazards," the Atomic Industrial Forum has reduced the price of the publication from $2.00 to $1.00. Prepared for the Forum by Columbia University, the 69-page report is available from the Forum headquarters, at 3 East 54th St., New York 22, N.Y.

THE 1957 TRADE FAIR of the Atomic Industry opens October 28, at the New York Coliseum, New York City. The October 28-31 Fair is sponsored by the Atomic Industrial Forum as is the 4th Annual Atomic Industry Conference, which runs from October 28 to 30. The conference will be held at the Plaza and Waldorf-Astoria Hotels as well as at the Coliseum. Scheduled to run concurrently are: the 2nd Winter Meeting of the American Nuclear Society, at the Henry Hudson Hotel and the Coliseum, October 28-30; the 2nd Annual Conference on "Careers in Nuclear Science & Engineering," Coliseum, October 29; Conference on Reactor Safety, Coliseum, October 31; and the Annual Conference, Professional Group on Nuclear Science, Institute of Radio Engineers, Coliseum, October 31-November 1.

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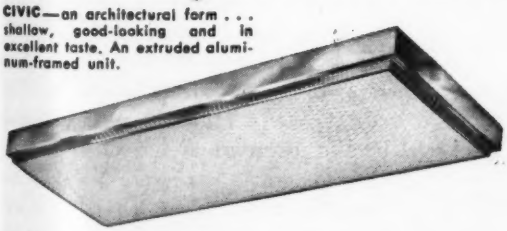
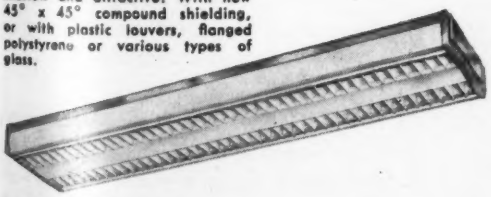
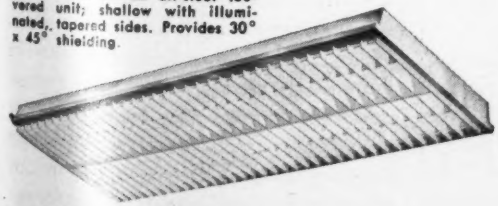


TWOSOME — Top value, low cost, shallow and attractive. With new 45° x 45° compound shielding, or with plastic louvers, flanged polystyrene or various types of glass.



EXECUTIVE — an all-steel louvered unit; shallow with illuminated, tapered sides. Provides 30° x 45° shielding.



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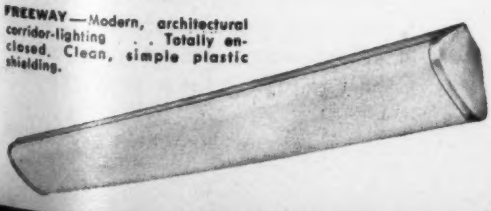

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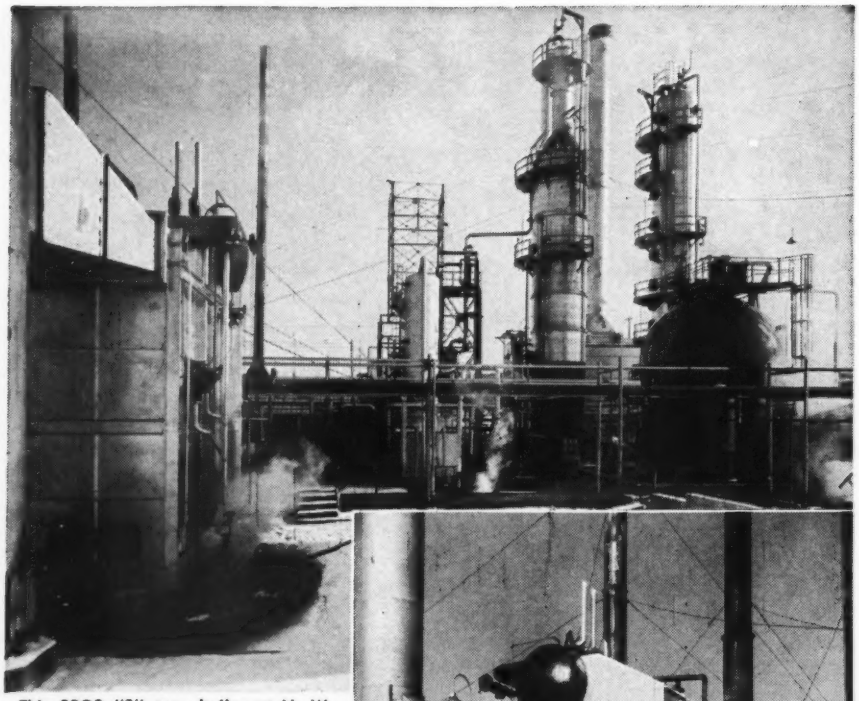

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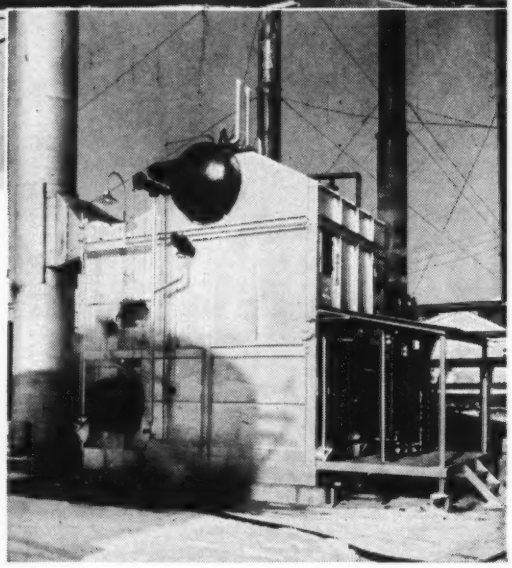

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The boiler is fired by 4 combination gas-oil burners. It operates with natural draft using a 150 ft. stack. It is currently being fired with fuel gas from Northwestern's catalytic cracking unit.

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75TH YEAR

Designers and Manufacturers of Watertube Boilers, 2-3-4 Drum and Packaged Designs, Auxiliary Equipment, and a full line of Industrial Stokers.

AMERICAN-STANDARD has applied to the AEC for a license to construct a zero-power model of its University Training Reactor (UTR-10) at its new atomic energy division laboratories under construction in Mountain View, Calif. The reactor is a 1-watt prototype of a 10-kw design planned for installation on the campuses of colleges and universities to train nuclear engineers and physicists in reactor technology. A further development of the Argonaut, it will have a core consisting of two fixed fuel containing slabs separated by graphite and reflected by graphite. The reactor at the A-S laboratory will be used to train university personnel in reactor start-up operating techniques of the UTR-10.

AMF ATOMICS, division of American Machine & Foundry Co., will export a pool type heteregeneous solid fuel reactor, light water moderated and cooled, to McMaster University, Hamilton, Ontario, upon receipt of a license from the AEC. Designed to operate at a maximum power level of 1000 kw (heat), the facility will be partly equipped for possible later conversion to 5000 kw.

FUTURE SAFETY systems for nuclear power reactors will provide for continuity of operation without sacrificing safety, according to Ivan M. Jacobs, of General Electric Co., San Jose, Calif. Speaking before the Pacific General Meeting of the American Institute of Electrical Engineers, he said that in the future it should be possible to reconcile the two objectives of a reactor safety system—never failing to scram the reactor on a bona fide power excursion and never scramming the reactor for any other cause, including component failure.

ARGONNE NATIONAL Laboratory has been working on a process for separating and purifying irradiated uranium by dissolving fuel in molten zinc, followed by formation and separation of an intermetallic uranium-zinc compound. Preliminary results indicate that this process for limited decontamination may be suitable for use in integrated facilities containing an operating reactor, a chemical processing plant, and facilities for remote fuel element refabrication. The process may permit separation of hard-to-remove fission products. ▲▲

The Publisher Reports To the Readers

CONSULTING ENGINEER magazine is the creature of its readers. The measure of its success as a publication is the extent to which its readers find it useful, read it, like it, and recognize it as the voice of their profession.

The publisher conducts the operation in trust for the real owners — the readers. It is proper that he should report to them periodically, so here is the first report.

Serving a Growing Profession. The private practice of engineering is growing rapidly and, to keep pace, so is the circulation of CONSULTING ENGINEER. A year ago 9500 copies were mailed each month. This month 10,700 are going into the offices of consulting engineers. This means an average of 100 new readers each month during the year.

Canadian circulation also has been added during the past six months. More than half the consulting engineers of Canada now receive the magazine. Soon, all of them will receive it.

Journeys of Discovery. Rapid growth of the profession has been accepted as a fact, but until recently no one knew how significant this growth really was. With your help, we threw some light on this.

Last fall you were generous in answering questions asked about such matters as the age of your firm, the size of your firm, the nature of the professional services rendered, and the types of clients served. From this information was compiled the now-famous "Survey of the Profession" published in CONSULTING ENGINEER in January, February, and March. It proved to be so informative that it had to be reprinted and later made broadly available in condensed form as a booklet called "See How They Grow." This was published in April, and many thousands of copies are now in use by manufacturers, advertising agencies, and others.

A few months ago, motivated by the need to promote greater understanding of the profession, we invited some of you to become members of the CONSULTING ENGINEER "Committee of One-Hundred." The idea was to illuminate certain important areas that often are subject to ignorance and confused thinking on the part of people wanting to do business with consulting engineers.

You who were invited gave enthusiastic response, and the report of the Committee appeared in the July issue of CONSULTING ENGINEER under the title, "How to Write Engineering Specifications." Demand for reprints of this article has been heavy. More than 6000 copies already have been purchased by manufacturers to be put in the hands of their salesmen with a view to enlarging their understanding of the engineer in private practice.

Editorial Department Expanded. The pleasant and rewarding work of serving you editorially is now shared by more people. In addition to enlarging the editorial personnel at the home office, we have added a regional field editor. Marjorie Oden, with her office in New York, began her eastern duties with CONSULTING ENGINEER in June. In addition, Ralph Torgerson is now our regular correspondent on the West Coast, and we published the first of his regular "West Coast Reports" in the July issue.

With their help and with the growth of the magazine, you now are getting an average of 68 pages of feature articles and departments in every issue. This is 25 percent more than the magazine brought you a year ago.

Several new departments have been added. Among the most popular is "The Word from Washington," prepared exclusively for us by Edgar A. Poe, who has been a Washington newspaper correspondent for many years. There is also a new department, "Heard Around Headquarters," which reports on the activities of the national engineering societies, and a

"Report from the East Coast" to balance Torgerson's reports from the West. While we do not pretend to be a news magazine, it is surprising how much really newsworthy material gets into our pages first. There is a good reason for this. Actually, we are the only magazine constantly on the lookout for material that is of primary importance to the consulting engineer. For example, we were the first to carry the story on the errors and omissions insurance crisis, when it was found that consulting engineers with Lloyds policies could not legally renew them.

We are glad to report that you are a responsive audience. The quantity and quality of the letters we receive from readers is gratifying. These letters tell us what you like, and we always appreciate your comments.

"Testing, Testing . . . ." Last September we started a testing routine to find out how our efforts to serve you are succeeding. We call it the "Reader Playback." We send out to readers instruction sheets, pencils, and copies of an issue, asking that the copy be marked to show which articles and advertisements are recalled and which are read. The marked copies have been valuable in giving us editorial guidance and in helping our advertisers judge whether the kinds of advertisements they put before you are interesting enough to claim your attention. The issues of September 1956, February, and July 1957, were tested in this manner.

Extracurricular Activities of Editors. You have been kind enough to invite editors of CONSULTING ENGINEER to address many of your meetings. In the past year, our editors have talked before meetings of societies and associations all over the country. This has been a wonderfully refreshing and helpful experience; it has enabled them to know you better and to form many valued personal friendships.

"How to Sell a Consulting Engineer. It is no secret to you that many manufacturers would like to have your acceptance of their products, and they would be delighted if you chose to specify them for your projects. But up until five years ago, no one in this country ever wrote an advertisement specifically directed to consulting engineers. There was no consulting engineer publication in which to publish it if they had written it. Hence, after CONSULTING ENGINEER was launched, there was much interest in how to prepare advertisements that would help you most and appeal to you. This led to a demand for a compendium of ideas on the subject, so a few months ago we produced a booklet called "How to Sell a Consulting Engineer." Many of you have seen this, for several thousands of copies were ordered by consulting engineers even though the book was written for advertising men. Over 7000 of these booklets are now out working.

Speaking of Advertisements . . . The advertising pages of CONSULTING ENGINEER form an important part of each issue. Some idea of how much your importance is recognized, your goodwill desired, and the opportunity of talking directly to you is valued is shown by the increased number of advertising pages being put before you in CONSULTING ENGINEER. A year ago each issue carried about 75 advertising pages, today the average is about 115 pages of advertisers' information.

This increase has made demands upon our business staff. In the past six months two more senior business representatives have been added, one in the area around Cleveland, the other in the Midwest around Chicago. Also, a few months ago a well-known publishers representative was engaged to represent CONSULTING ENGINEER on the West Coast.

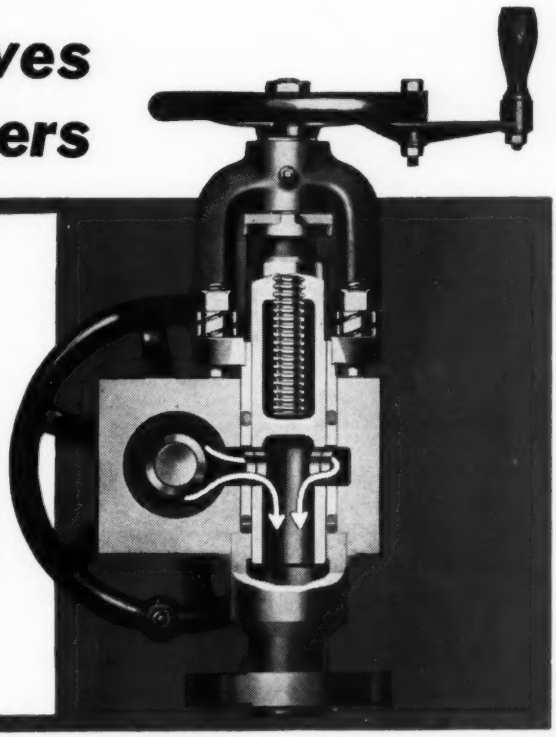
Product Information. You have made good use of the CONSULTING ENGINEER Advertisers' Literature Supplement service. In the past twelve months you have sent in requests for more than 67,000 pieces of manufacturers' product literature, which we have forwarded to the more than 250 manufacturers who advertise in CONSULTING ENGINEER.

These are a few highlights of what we've been doing in the past twelve months. This is only a beginning — the publication is not yet five years old. It was launched with the conviction that its audience was one of the most important in the economic fabric of this country and that serving this audience would be a happy experience. To date we have found it so, and our intention is to constantly improve our service in order that we may rightfully claim some share in developing your important profession.

Publisher

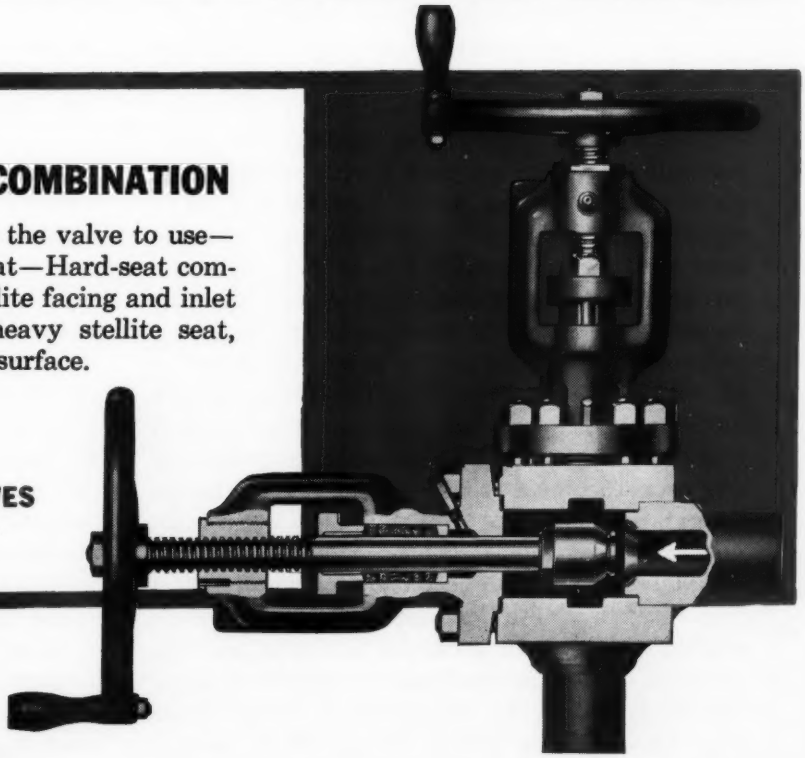
UNIT TANDEM

rugged blow-off valves for high pressure boilers



HARD-SEAT—SEATLESS COMBINATION

■ For boilers up to 1500 psi, this Yarway Unit Tandem Blow-Off Valve offers the maximum in dependable service. A one-piece forged steel block serves as the common body for the Yarway Stellite Hard-seat blowing valve and the Yarway Seatless sealing valve. All interconnecting flanges, bolts and gaskets are eliminated. The Unit Tandem at right is sectioned through Seatless Valve to show balanced sliding plunger in open position and free flow.



HARD-SEAT—HARD-SEAT COMBINATION

■ For boilers to 2500 psi, this is the valve to use—Yarway's Unit Tandem Hard-seat—Hard-seat combination. Disc has welded-in stellite facing and inlet nozzle has integral welded-in heavy stellite seat, providing smooth, hard-wearing surface.

OVER 4 OUT OF 5
HIGH PRESSURE PLANTS
USE YARWAY BLOW-OFF VALVES

Write for Yarway Catalog B-434

YARNALL-WARING COMPANY
106 Mermaid Ave., Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY **BLOW-OFF VALVES**

Errors
and Omissions

How the game goes . . .

- *Lloyds Flys Out*
- *Pinch Hitter Coming Up*
- *Continental Holds at Second*

STAFF REPORT

NOT LONG AGO, if a consulting engineer wanted to buy an errors and omissions insurance policy, he had one choice. He could take the policy offered by Lloyds of London, or he went without. No American firm handled insurance of this type.

CE exclusive

Then, Continental Casualty Co. came out with their own errors and omissions policy, and they now are legally permitted to offer it in all of the 48 states.

Because state legislatures traditionally have favored American companies over foreign corporations, most states have a "surplus line law," which requires any broker selling insurance issued by a foreign corporation to file with each policy an affidavit stating that American companies have refused to write such a policy.

Since Continental Casualty now is registered in all states, brokers handling Lloyds no longer honestly can say that no American company will underwrite an errors and omissions policy for engineers. So, as a result, anyone now acting as a broker for Lloyds cannot legally renew his clients' errors and omissions policies, in most states. Instead, he can only issue a policy from an American firm, i.e., Continental Casualty.

This situation is a particularly serious one, not only for individual holders of Lloyds policies, but also for several engineering organizations who have offered their members these policies under group arrangements. The American Institute of Consulting Engineers has a group plan, as does the New York Association of Consulting Engineers, and the Consulting Engineers Council was just entering into a Lloyds group policy agreement. The Council, in investigating group policies, had studied both the Lloyds policy and the Continental Casualty policy, and had picked Lloyds as being preferable for several reasons, including price of the policy.

Now, with Lloyds unable to legally offer errors and omissions insurance to engineers in this country, all of these organizations and all individual Lloyds policy holders face a serious problem. It looked for a while as though the only solution was to take the Continental Casualty policy or just forego errors and omissions insurance.

An alternate solution now presents itself. An outstanding American insurance company well known for its casualty experience now has tentatively agreed to write policies at rates competitive with the Lloyds policy, and the firm currently is applying for registration for this policy in all states. However, the offering of this policy depends on whether the Consulting Engineers Council, the largest of the organizations having the Lloyds group policy, will accept this insurance firm as their underwriters.

A spokesman for and officer of the Council has written to all members of the Council executive committee, explaining the trouble and recommending that the Council sponsor this new policy for the members of their Member Associations. It seems most likely that the executive

committee will go along with this recommendation, for the recommended policy has most of the advantages of the Lloyds policy, plus a few more. It seems likely that the premium rates of the policy may be even lower than Lloyds.

Hauth Offers New Policy

H. C. Hauth & Co., who handle a majority of Lloyds' errors and omissions policies for consulting engineers — including the Council and the Institute — has announced that they no longer will issue Lloyds of London policies to members of these associations.

C. S. Carstens, who has acted for the Hauth Co. in dealings with the Council and the Institute, said that instead his firm will represent the American firm now being registered.

Carstens said that eventually this situation would have developed without the current crisis. However, the registration of Continental at this time, making it legally impossible to re-issue Lloyds policies, brought the matter to a head.

Major Differences

"The new errors and omissions policy offers, broader coverage than past Council and Institute policies gave," Carstens said.

The major differences in the proposed errors and omissions policy and the Lloyds policy are:

¶ If a person insured with Lloyds purchased a $100,000 policy, then got in a lawsuit for $100,000 and lost, he would have to pay his legal fees — that is, if the policy holder had an attorney of his choice (as he was allowed to do under the terms of the Lloyds policy) instead of using legal counsel under a Lloyds retainer. The proposed policy offers to cover unlimited legal expenses, in addition to the maximum amount of protection. Under the proposed policy, however, the consulting engineer must use counsel provided by the insurance company.

¶ Lloyds covers a consulting engineer on projects in foreign countries. The proposed policy covers only work in the United States and Canada. However, Carstens said that if a consultant wants foreign coverage, it can be arranged.

¶ In the newly written policy American insurance terminology is used, as compared to the rather verbose British style of Lloyds.

¶ The new policy, as did the Lloyds policy, offers a "discovery" form of insurance, at no additional cost. An engineer is covered on all previous projects he has done, provided no errors have been discovered prior to the date of taking out the policy.

¶ The American insurance firm, like Lloyds, is not likely to settle a claim out of court without the consent of the consultant. The policies have varying deductible figures, and if the company settles without the consultants' consent, they have to pay the deductible themselves.

Continental Casualty Co. entered the errors and omissions field at the request of the American Institute of Architects, according to Carl A. Anderson, Vice President of Victor O. Schinnerer & Co., Inc., representatives of Continental, in Washington.

Anderson said the AIA conducted a poll of its members to see what coverage they wanted in errors and omissions. Later, the National Society of Professional Engineers made a similar poll, and the Continental policy was written to include coverage of both groups.

A spokesman for NSPE said that in investigating errors and omissions policy prospects, NSPE representatives talked with a number of brokers concerning these policies, and that they felt that the premiums were more than NSPE members would want to pay. They also felt that the Lloyds' policy contained some rather restrictive language.

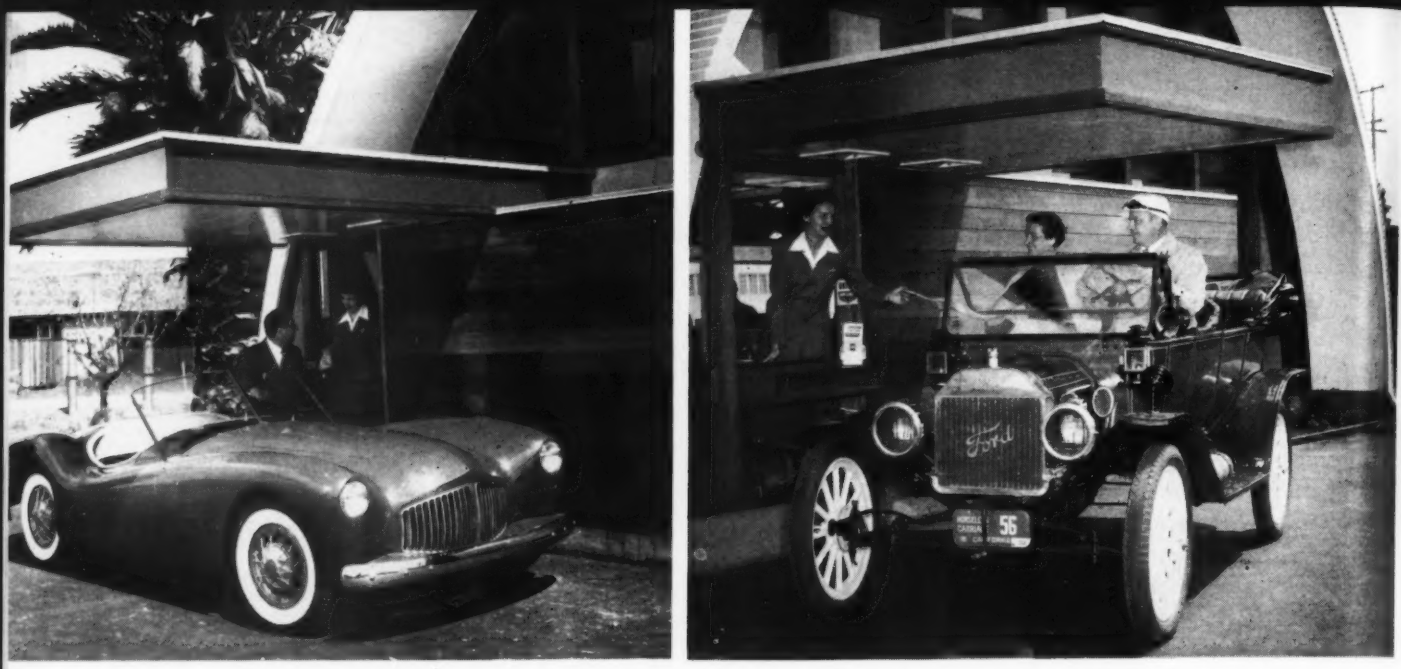
When the NSPE started collaborating with the AIA on the errors and omissions policy, the AIA already was negotiating with Continental and several other American firms.

The NSPE this year endorsed the Continental policy, but NSPE, the spokesman said, has no connection with Continental other than the fact that NSPE refers engineers who are interested in errors and omissions insurance to that firm. This is undoubtedly true, and it is just unfortunate that as a result of the Continental policies a condition was set up that made it impossible for consulting engineers who now hold Lloyds' policies to renew them.

The Back Door

If consultants still want to continue their Lloyds insurance, there are two ways they can do it. They can go to a broker in a state which has no surplus line laws (they are few). Or he can go to a Canadian broker. However, going out of the country to purchase insurance is done at the consultant's own risk. He has no protection from a state insurance department, and he has no assurance that the broker with whom he is dealing understands the complicated policy or that he knows anything about engineering.

"A situation like this can lead to a lot of grief," Carstens pointed out. ▲▲



A LITTLE EXTREME, PERHAPS, BUT ILLUSTRATIVE OF THE NEED TO DESIGN FOR ALL TYPES OF AUTOMOBILES.

Designing Drive-In Facilities

ROBERT G. DYMENT

DURING THE PAST ten years, consulting engineers responsible for the design of banking facilities have known that many of their clients desire drive-in facilities for all new or remodeled structures. Other engineer firms may not be fully aware of the importance of this development, even though the word "drive-in" has become familiar to all.

CE exclusive

Based on a national survey recently completed by this writer, it would seem that drive-in selling is with us to stay and will become increasingly important in the future design of buildings that house organizations dealing directly with the public. Consultants should be aware of this trend and prepare for an increased client demand for drive-in facilities.

To understand why drive-in selling is popular it is necessary to study the various reasons given by companies and organizations already using drive-in facilities and those contemplating their use.

With more automobiles than ever on the highways and city streets, it is a growing and continued headache for the motorist to find parking space. Drive-in facilities allow a person to drive his car off the crowded streets and pull up next to a teller or clerk's window. Business can be conducted from the car without parking difficulties.

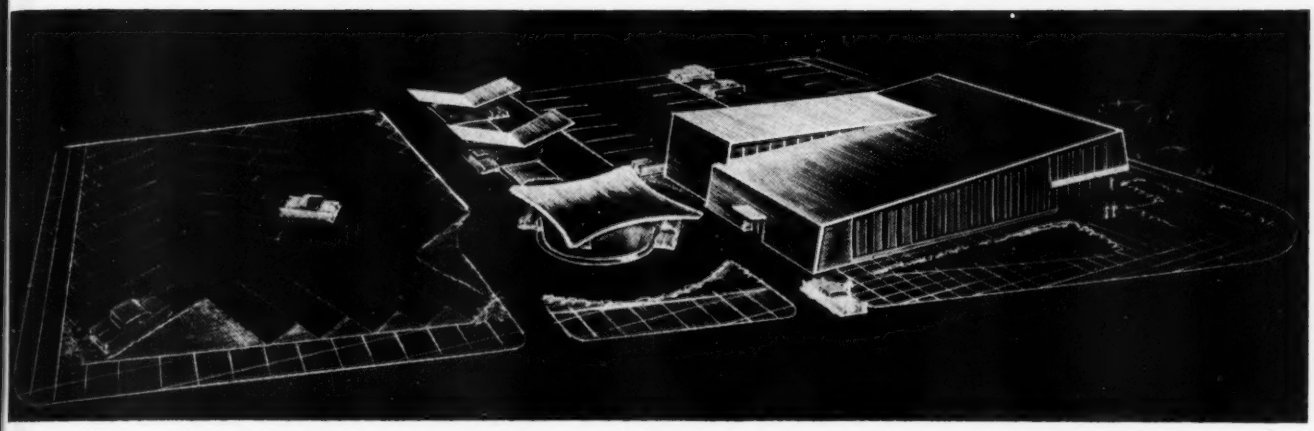
Somehow, people have more things to do, more places to go, more people to see, and less time to do it in. Business must be completed as quickly and as conveniently as possible. Population growth and migration from city to suburbs are major factors.

Bankers were first to want drive-in facilities in conjunction with their new buildings. They have been pioneers in this field. The manufacturers and Traders Trust Company, Buffalo, N.Y. has four drive-in offices located in the city and in various towns surrounding Buffalo. Each of their offices are designed to provide ample space for easy maneuverability of cars. The Niagara Falls Street Office is equipped with closed circuit television to speed account and balance verification between bookkeeper and tellers, and the drive-in teller has a TV screen at the window to provide instant communication with the bookkeepers located on another floor.

Donald E. Ehlenfeldt, Assistant Vice President of the National City Bank of Cleveland, Cleveland, Ohio, says that their first Auto-Teller was placed in operation in 1950. All offices built in recent years are equipped with drive-in windows, and all future offices they are planning will have Auto-Tellers.

The Bank of California opened their first drive-in bank, in San Francisco, in January, 1949, at their head office. It has eliminated many parking difficulties for their customers in the financial district of San Francisco, always an acute parking area. This drive-in window averages about 100 customers daily, and it has handled as high as 150 cars a day.

Their San Francisco Mission office has a drive-in teller window and also a parking lot. These were developed about five years ago. Their Seattle and



THE JEFFERSON BANK & TRUST COMPANY, ST. LOUIS, MISSOURI, IS BUILT ON A STRATEGIC SITE WITH ACCESS TO THREE MAJOR THOROUGHFARES. MAIN BANK BUILDING, ROUND ISLAND DRIVE-UP UNIT AND PARKING LOT ARE NOW IN OPERATION. A TUNNEL CONNECTS ALL THREE MOTOR UNITS WITH THE MAIN BANK BUILDING.

Portland offices both are using drive-in facilities, but they use a snorkel curb-type teller. The Tacoma office uses a walk-up teller window with an adjoining parking lot.

Inadequate planning and inexperience in the complexities of drive-in design have reduced the effectiveness of many installations. With proper study and sound planning a consulting engineer can avoid many mistakes and can design facilities that will be an asset to his client.

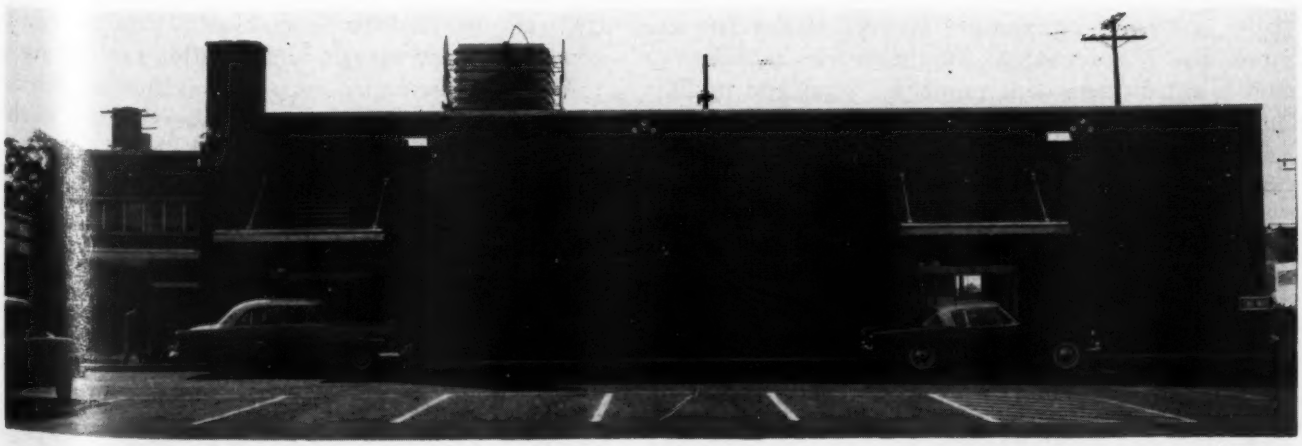
The Bank Building Corporation of America, with headquarters at St. Louis, has had extensive experience in drive-in bank planning. They have designed some of the largest and finest drive-in banking facilities in the country. They say that most banks should consider the construction of drive-ins as an immediate project, separate and distinct in itself. They say these projects should be tailored to the bank's own situation. Merely installing a drive-in window is seldom satisfactory. A thorough study of local conditions and future needs is essential.

Preliminary surveys for drive-in facilities involve many basic considerations. Consulting engineers must concern themselves with traffic patterns, volume, and regulations as well as specific problems having to do with the particular site available. The care and study given these and other factors, such as motor business potential, are vital to the success of a project and its operation.

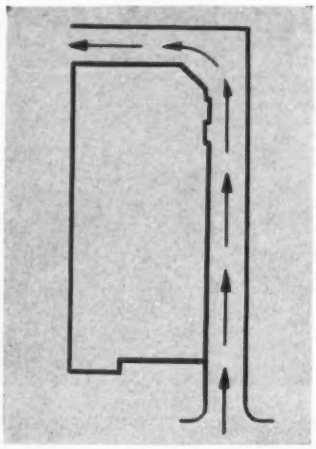
Sources of Data

This preinstallation survey is equally important for all types of drive-ins, whether they be contemplated as part of an existing building, on property already acquired, or on a new site not yet determined.

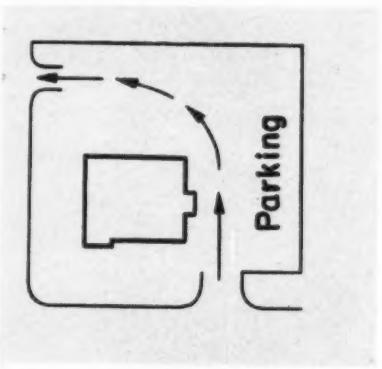
Sources for such information abound in almost any locality. City police and traffic officials are constantly making surveys and records of traffic flow. Municipal planning boards and chambers of commerce can give data on forseeable changes that may affect a site location. The local outdoor advertising company can show you on its map the daily traffic density of every major thoroughfare; the bus company can reveal auto ratios by neighborhoods. And so far as customer potential is concerned, start with city census figures from the library; check your



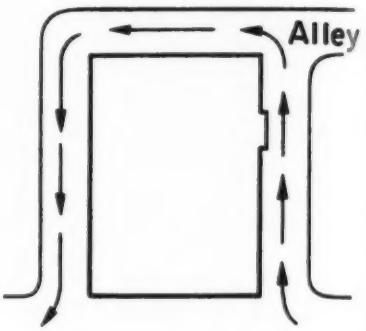
NEW NATIONAL CITY BANK OF CLEVELAND ILLUSTRATES A GOOD DESIGN FOR A TWO-WINDOW INSTALLATION.



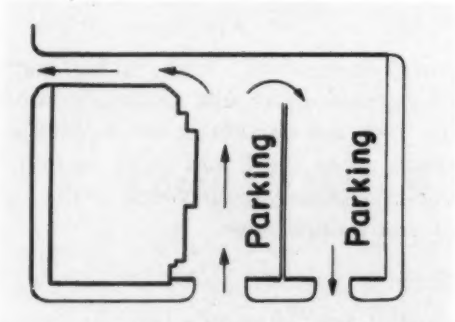
1. ONE-DIRECTIONAL L-SHAPED LANE



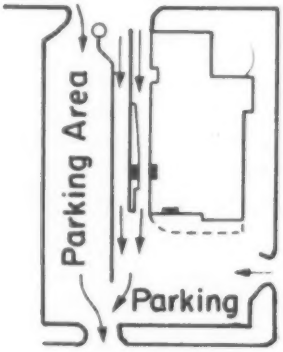
2. L-SHAPED LANE PLUS PARKING



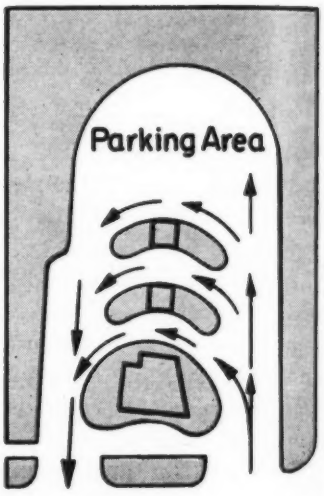
3. U-SHAPED DRIVE-IN LAYOUT



4. BAY-TYPE FOR DRIVE-UP AND WALK-UP



5. DRIVE-UNDER LAYOUT



6. "FILLING STATION" ARRANGEMENT WITH THREE ISLAND UNITS PLUS PARKING

1. American State Bank, Mankato, Minnesota uses a one-way L-shaped lane for its single drive-up window.
2. The Farmers National Bank, Prophetstown, Illinois employs the same lane and single window technique but also has parking space at the rear of the building.
3. The Bank of St. Ann, Missouri channels drive-in traffic around the bank on a one-directional U-shaped drive.
4. The Union National Bank, Ottumwa, Iowa has bay-type combination of two drive-up and one walk-up window.
5. The Bank of Virginia, Portsmouth, Virginia is a variation of the drive-under principle. One of this bank's drive-up windows is built underneath the building, but serves a drive just outside of the building line.
6. The Bank of Akron Auto Branch, Akron, Ohio is a good example of service based on "filling station" principle. Note the free-flowing traffic lane pattern and the three island units, one of which is combined with the walk-in "money store," which also houses the vault. Bulletproof picture windows behind each of the two outer islands enable all tellers to see each other.

findings with the U.S. Census Bureau. Valuable statistics covering communities outside of the larger cities also are available. Another early consideration is consultation with municipal, legal, and traffic authorities with regard to local zoning restrictions and traffic laws, for drive-in installations frequently affect the city traffic pattern.

Selecting the Type

After preliminary investigation it is necessary to decide what type of drive-in installation is the most desirable. Three types are in general use.

¶ Accommodation Type — A single window layout.

¶ Motor Service Department — Usually a two window operation which enables the firm to handle immediate needs adequately.

¶ Superservice Motor Operation — Multiple drive-up, walk-up windows — enabling a firm to provide complete motor service and go after new business.

The accommodation type unit is the answer for some while it is just the start for others. Basically, the single drive-up window applies to the small operation, where it can provide a service and carry a part of the over-all work load. It currently is doing a good job for small banks in congested city areas and outlying locations.

Designs that answer the needs of the small firms or branch operations can be a headache for larger ones. Too many single window units have been installed as an accommodation or extra customer convenience, when they should have been planned as an important new service, with real potential for growth.

This situation has caused a number of banks to start over from scratch when drive-in facilities had to be expanded. It is more economical for future expansion to be planned with the initial project.

Some clients are limited to small accommodation installations because of site and regulation factors. Located in strategic but congested downtown areas, they are virtually land-locked. Space is not available for adequate drive-in banking facilities.

A snorkel or single window provides some relief in these congested areas. The new TV type snorkel provides a more personal contact with customers. It is a definite improvement over the original snorkel. It works like a regular TV set. A customer presses a button, and the teller appears on the screen. They can see and talk with each other during any transaction. Passbook and deposit travel to teller and back through a pneumatic tube.

Small Installations

The two-window installation does an effective job of providing adequate capacity for the average bank's basic drive-in needs. Frequently it may be advantageous to include a walk-up window. This combination can do a substantial job of relieving work load from the main lobby on peak days. This arrangement has enabled more than one bank to forego expansion of the main banking room. Bankers report that a single window can handle anywhere from 150 to 450 automobile transactions per day.

Two-window drive-in installations are designed most often as an integral part of the main building, usually along one wall. In states where branch banking is permitted, there is a growing tendency to build a separate double window unit, simultaneously providing for extension or enlargement of this unit.

The superservice drive-in operation is used when a client decides to go aggressively after drive-in business. An outstanding example of this is the Jefferson Bank and Trust Company, St. Louis, built on a strategic site with access to three major thoroughfares. The main bank building, round island

DRIVE-UP WINDOWS CAN BE ADDED TO CONVENTIONAL BUILDINGS EVEN IN CROWDED DOWNTOWN AREAS.

drive-up units, and parking lot are now in operation. Two smaller drive-up units are being contemplated. A single underground tunnel connects all three motor units with the main bank.

Superservice Designs

Drive-in bank design, on this scale, has a wide range of possibilities:

¶ Island facilities, either on a separate site or on one adjacent to the main bank.

¶ Annex or peninsula-type, jutting outward from the main building.

¶ Autobanks, separate branches designed for motor banking, sometimes with a number of individual window units.

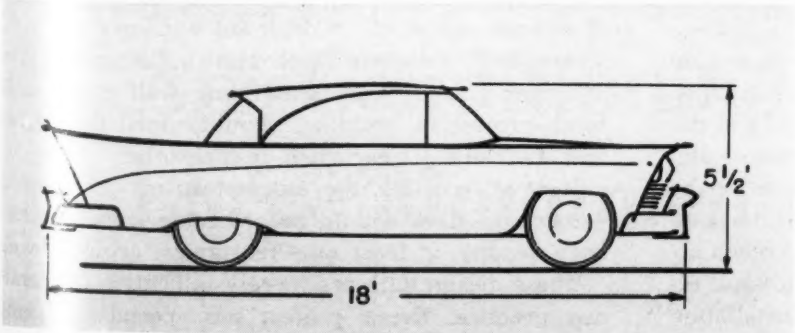
¶ Wall-type, built into the side of the main bank.

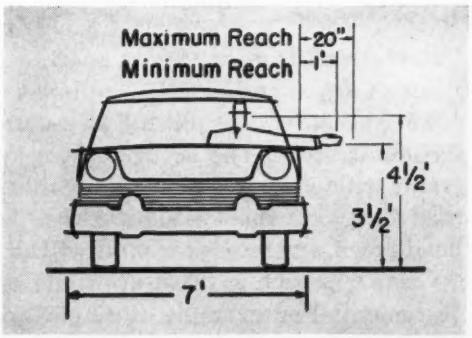
¶ Drive-through, where cars drive through a wing or under a part of the main building.

¶ Garage-bank, facilities designed as a part of a parking garage.

Almost without exception, superservice installations like these must include ample additional parking area for the use of customers who must take more time than drive-in banking permits — and for future expansion space.

Insurance firms also make use of drive-in selling. One of the first such agencies to open in the eastern part of the United States was the Drive-In Insurance





WITH TRUCKS AND SPORTS CARS USING DRIVE-UP WINDOWS, IT IS DIFFICULT TO SET MEDIAN DIMENSIONS. THESE FIGURES, HOWEVER, STRIKE A GOOD AVERAGE FOR STANDARD SIZE CARS ON THE ROAD TODAY AND ILLUSTRATE THE FACTORS INVOLVED AFTER A CAR STOPS AT A WINDOW. THESE INCLUDE: LENGTH OF CUSTOMER'S REACH AND PROJECTION OF DEAL DRAWER; HEIGHT OF THE AVERAGE CAR'S WINDOW SILL; AND EYE LEVEL OF THE CUSTOMER.

Agency of Rochester, N.Y. operated by James H. Hamill Associates, Inc.

Mr. Hamill stated that the facilities have proven to be more popular than anticipated. The public's satisfaction with this means of selling insurance has been tremendous. There are also drive-in insurance agencies in the midwest and in California.

Canton, Ohio got its first drive-in prescription counter when the Bowman Drug Company, of that city, recently inaugurated its new modern retail drug quarters. Built by Diebold, Incorporated, of Canton, the new drive-in facilities offer Bowman customers fast, convenient prescription service.

The window opens directly from the prescription room onto a side driveway so that the one pharmacist can handle customers inside the store as well as drive-in patrons. Entry to the window is made from the main street on which the building fronts and patrons leave by way of a small street at the back of the building, avoiding traffic congestions.

Airline Ticket Sales

Airlines, too, are following the drive-in selling trend. George C. Wright, District Sales Manager for the Syracuse, N.Y. area stated that American Airlines instituted the first drive-in ticket office in conjunction with a drive-in bank. The drive-in office now accounts for about 35 percent of their city revenue. Customers are pleased with it, and drive-in business is more than twice that of last year.

United Air Lines have a drive-in ticket office on the West Coast. It was built approximately four years ago at Redwood City, Calif., and has proven most successful.

The ticket office is located in a grove of palm trees beside El Camino Real, the peninsula's main highway. Sales agents at two windows enable motorists to buy tickets without alighting from their cars. A canopied parking area is provided for those desiring information on itineraries and tours.

The drive-in is an arched roof structure, trimmed with brick and California redwood. Front and rear walls are glass. The interior has conventional ticket office furnishings, with Hawaiian decorative details.

Design Dimensions

Everything from trucks to sports cars, in a wide range of styles and models, are using drive-up windows. Therefore, it is difficult to determine ideal design dimensions. The accompanying dimension diagrams strike a good average for standard cars on the road today. Customers in trucks will just have to bend down, and sports car buffs will have to reach up.

Clear approach to drive-up windows is a basic requirement. For example, a single unit installation (or the first window in a series) should be located far enough from the sidewalk line so that several cars (usually five) can wait their turn without blocking pedestrians. Windows should be on the left side of a level, one-directional driveway, at least 10-ft wide, with the approach from the street entrance in as straight a line as possible. If a single lane is to serve more than one window, the units should be separated by a minimum of 22 feet, center to center. For a dual lane driveway (minimum width, 25 feet), increase this center distance 10 feet to enable cars to cut out from a rear window to pass the vehicle in front. Curbs must be used to keep cars the proper distance from walls and windows. Island and peninsula-type units permit a variety of traffic flow patterns, usually making better use of available space, when plans are well conceived.

Once a car stops before a window, human dimension takes over. This involves several considerations:

¶ Length of customer's reach and projection of the deal drawer as it reaches out toward him.

¶ Height of the average car's window sill, as the customer reaches his arm toward deal drawer.

¶ Eye-level of customer in car as he watches teller.

Manufactured Equipment

The manufacturers of drive-up windows have considered these factors in design of their equipment.

All windows provide two-way verbal communication but no direct contact between teller and customer. The transaction is completed through an illuminated, sliding deal tray. Counter equipment depends on the client's requirements. Deluxe counters come with electrically operated deal trays that can receive packages as well as regular forms. Counters can have built-in electrical systems, heating and cooling units, and defrosters to keep windows clear. They can be connected with the main office through a multiple intercom system. Teller drawers, cash registers, ticket printers, and television are available as required.

There are three basic types of windows. The full vision bay window gives 180 degree visibility and provides room for a large counter. The modified flush type has a slanted window that is flush at the bottom but projects out at the top. It has a roomy counter interior but takes less space on outside. The flush type is a small compact window with deal-drawer at one side. It mounts flush to the wall and uses a minimum of outside space. Most drive-up windows are constructed of stainless steel and bulletproof glass. Whether aligned with a building wall or in sawtooth projection, windows should afford the driver and the clerk a clear view of each other.

If at all possible, the entire transaction between driver and clerk should be protected from weather by a canopy, at least nine feet above ground level.

These design data are merely indicative of standard practice. Every project has special problems and every site should suggest new design solutions. Drive-in design, just like any other project, demands thoughtful and original engineering. That is the special province of the consulting engineer. ▲▲

Project Reports

Air-Conditioning Large Monumental Buildings

Here are concise reports on five recently completed air-conditioning projects. The information for each was provided by the consulting engineer. An introductory article, by Alfred L. Jaros, Jr., of Jaros, Baum & Bolles, provides a perspective for following the five examples.

ALFRED L. JAROS., Partner, Jaros, Baum & Bolles

Alfred L. Jaros, Jr., partner in the New York consulting engineer firm of Jaros, Baum and Bolles, was graduated as a mechanical engineer from Columbia University in 1911. Before joining Albert L. Baum to form the firm originally known as Jaros & Baum, he was employed for about five years by Nygren, Tenney and Ohmes, consulting engineers on the New York Municipal Building, the Woolworth Building, and most of Columbia University. Jaros & Baum began practice in 1915, but the work of the firm was interrupted by World War I and was resumed in 1919. The firm is strictly an engineering service organization performing engineering design and supervision, evaluations, surveys, and professional reports, generally in cooperation with and under the employment of architectural firms or building owners. During its 40 years of practice the firm has had such outstanding projects as the London Terrace, the Park Vendome, and the Shelton Hotel as well as many theaters, college buildings, and hospitals. They designed the first radiant heated building in the United States, the British Embassy in Washington, D.C. Recently, they have handled such projects as Lever House, the Socony-Mobil building, the House of Seagram in New York, Republic National Bank Building in Dallas, the Alcoa Building in Pittsburgh, and the Mile-High Center in Denver. Jaros is a member of ASME, the NYSSPE, the New York Association of Consulting Engineers, and a number of other scientific and engineering organizations.

THE DESIGN OF AN AIR-CONDITIONING system for a large office building is a challenging engineering project. These buildings, perhaps more than any other type demand good, reliable, easily maintained systems.

Ce exclusive

An engineer faced with the design of an office building air-conditioning system must understand the two controlling factors. He must understand how the heat gets into the building, and he must determine the most efficient means for removing that heat. In most modern office buildings radiant heat from the sun is the major controllable factor having influence upon the size and cost of the air-conditioning system, and it is usually less expensive to keep heat out than it is to remove it after it is in.

Windows are the villains. Here is a typical computation for maximum simultaneous cooling demand for a typical office building with venetian blind shielded windows representing about 40 percent of the facade area.

¶ People, lights, office equipment (fixed load) ..36%
¶ Conduction through the walls and roofs —good construction, roof insulated 2%
¶ Conduction and solar radiation through windows — venetian blinds but no outside shading 27%
¶ Dehumidification of outdoor-air supply —fairly liberal ventilation 23%
¶ Miscellaneous, including heat from fans..... 12%

In this building, a 25-percent window area would have reduced the total refrigerating demand by about 10 percent, whereas a 70-percent window area (about the largest I have ever seen) would have increased it by at least 20 percent. With 40-percent windows, as assumed in the tabulation, complete outside shading of the south, east, and west windows would have reduced the refrigeration demand by about 20 percent. Note that this is twice the reduction afforded by using a facade with 25-percent window area.

This is where skilled engineering, as well as the cooperation of the architect, are needed. Good results cannot be secured if the architectural design provides inadequate or badly arranged mechanical spaces, nor is economy feasible if the design requires extravagant quantities of cooling and heating.

Air Handling Schemes

Each building, and even each facade, deserves special study for the best results. It requires bold initiative, perhaps an adventurous outlook, on the part of the architect and the engineer to secure the best combination of convenient operation, minimum maintenance, and economy.

Practically all office buildings require systems so arranged that the amount of heating or cooling can be independently controlled in the several differently oriented outside zones and in the interior zones. The need to do this, as economically as possible, has dictated the development of five different systems, each having its advantages and disadvantages for particular applications.

The Subdivided Conventional System is sometimes used for new buildings, but is more applicable to old ones. Here conventional systems, handling one, two, or three floors of a building are subdivided into several separate zones, selected according to exposure to sunshine and wind, occupancy, and other heat load factors.

Peripheral Ejector-Unit Systems make use of outer zones (usually extending from 15 to 18 feet in from the windows) which are cooled and heated by compact, local units located under the windows, each circulating locally conditioned-air to serve one module of this outer zone space. Inner zones are conditioned by separate ducted-air supply systems. Outer zones receive primary air (about 25 percent of the total air circulated) from remote primary fan rooms. This is delivered through small, high-velocity conduit ducts, usually run vertically near

each outside-wall column but sometimes horizontally in ceilings. Primary air is filtered, cooled and dehumidified or heated, and delivered at considerable pressure to acoustically-baffled units. By use of ejector nozzles, it aspirates several times its own volume of air from the room and delivers mixed air to give good local distribution. Aspirated room air passes through finned coils in each unit and is cooled or heated by water circulated through these coils. Very low units, less than one-foot high, that fit under large windows recently have been developed. These operate much more quietly than earlier designs.

Peripheral Fan-Unit Systems are similar to the ejector systems except that they use small motor-driven fans in the units to recirculate room-air. Primary air may enter the units at low pressure for mixing or may be delivered to rooms through separate outlets.

Double-Duct Systems are central high-pressure fan systems supplying two ducts with air at two different temperatures — one very low, the other moderately high. Mixing dampers, thermostatically controlled, deliver the correct temperature air to a control box supplying the outlets for each individual zone or room. This system gives excellent control and can be applied to mixing boxes under windows or in ceilings. It does require much more ducted air and larger ducts than the peripheral system.

Radiant Cooling Systems circulate cooled secondary water through pipe coils which extract heat from an aluminum ceiling attached under the coils, and exposed to room air. This system also provides effective winter heating through circulated warm water. For radiant cooling the ceiling must be colder than the air or the principal surfaces in room. About 15 F cooler than room air is about right. This allows a large reduction in amount of conditioned-air required if windows are smaller than 25 percent of the facade or if they are well shaded. Usually it is possible to combine outside and inside zones into a single duct system, supplemented by small convectors under windows for winter heating. Zone control is accomplished by varying the temperature of the water supplied to the radiant ceilings.

Refrigerating Methods

In any building with a maximum demand exceeding a very few hundred tons of refrigeration, current practice would call for centrifugal compressors, steam absorption machines, or a combination of both. The choice would depend on electric power rates, steam costs, and other individual conditions. Where medium or high pressure steam is available, steam turbines driving centrifugal compressors are economical and convenient. Where electric motor drive is indicated, hermetic centrifugals, operating at high speed, promise a considerable saving in space and sometimes in cost. Where steam is available at 10 to 20 psig, absorption machines are often economical. They are convenient to use on upper floors of high buildings because of their minimum vibration and low weight. Absorption equipment is especially applicable with high pressure water systems for heat distribution.

In the future, gas turbine drive may prove efficient for driving centrifugal compressors. High compressor speeds could be had without step-up gears. They may prove economical both in first cost and in operation.

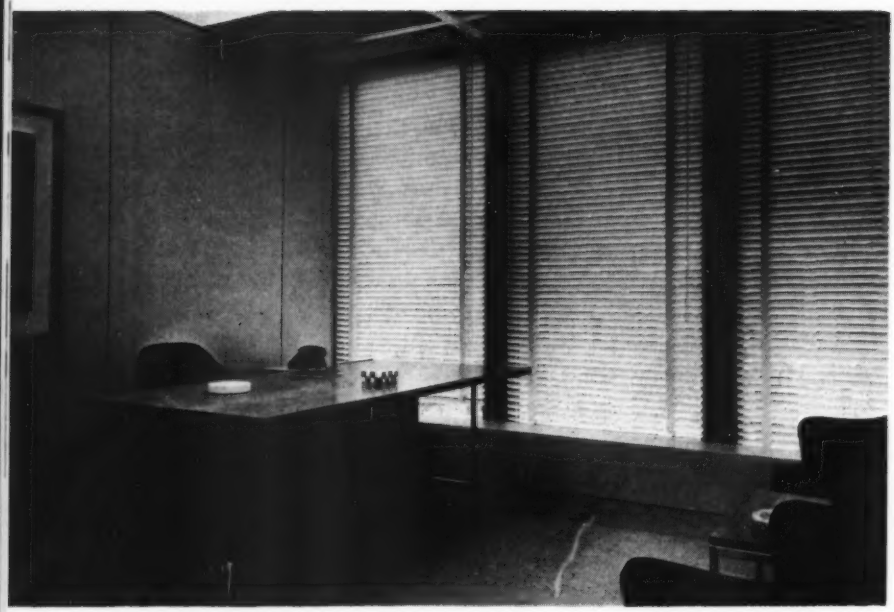
There is a trend to the use of heat pump systems — especially for locations where winter temperatures are not too low and where suitable heat sources (such as lakes or rivers) are available. The two-stage heat pump using air as the heat source (a recent development) may lower the winter temperatures with which these machines can be used. Further developments may be expected in this direction.

Choice of Systems

There should be no standard scheme. Study and experience, the geometry of the building, the quality of results considered appropriate, the relative importance of initial versus operating costs, and restrictions imposed by the building design should guide the engineer. The local costs for job fabrication or purchased equipment also affect the choice.

In my opinion, evolution rather than revolution will be the future trend in air-conditioning. There will be an occasional new scheme which will fit particular situations but will not invalidate good older schemes. An increasing use of radiant cooling and of double-duct systems can be expected. Proper zoning and good automatic controls will be used more than in the past. Details of equipment will be refined, maintenance made easier, and space requirements gradually reduced. Equipment gradually will become quieter in operation while air velocities probably will increase. Rotative speeds of compressors will increase, especially with steam or gas turbine drives. In time, reinforced plastics may largely replace metal in cooling towers — solving the corrosion problem.

It is doubtful if maintained indoor air temperatures will depart very much in the future from 75 F, a temperature that gradually is replacing the older standard of 80 F for continuous occupancy spaces. Nor are delivered air temperatures likely to go below 50 F, because operating cost for low temperature air —with its great dehumidification and low refrigerant suction temperature — probably will continue to overbalance savings in air-quantities and duct-sizes. Continued improvement in air-outlets, air-blenders, flexible ducts, automatic controls, and instrumentation are all to be expected. However, while the systems of 15 years hence probably will look quite different from today's, there is no apparent reason why good current installations should not still be satisfactory and efficient then.



Jaros, Baum & Bolles
Consulting Engineers
Mies van der Rohe, Philip Johnson
Architects
Kahn and Jacobs
Associate Architects

Seagram Building - - New York City

New York's 38-story Seagram Building, which will be ready for occupancy this fall, has a distinctive bronze skin, setback tower construction overlooking large plazas, floor to ceiling windows, and an air-conditioning system tailored for the large expanse of windows and the maximum use of floor space.

Jaros, Baum & Bolles air-conditioned the periphery of the building with special low-profile, high-pressure, high-velocity, air induction units, which are recessed into the floor. Each unit is concealed behind panels.

Special offset angled sleeves, duct branch connections, and pipe branch connections are installed in the floor slabs so that air and water connections will not interfere with the spandrel steel. A continuous window-unit enclosure is connected to the exterior columns, with attachments to partitions at each mullion. The offices have individual temperature controls.

The interior area of the building is air-conditioned by high-velocity, high-pressure, double-duct (hot and cold) air risers, which serve several air mixing units at each floor to give zoned temperature con-

THE SEAGRAM BUILDING UNDER CONSTRUCTION. ABOVE, VIEW OF TYPICAL EXECUTIVE OFFICE.

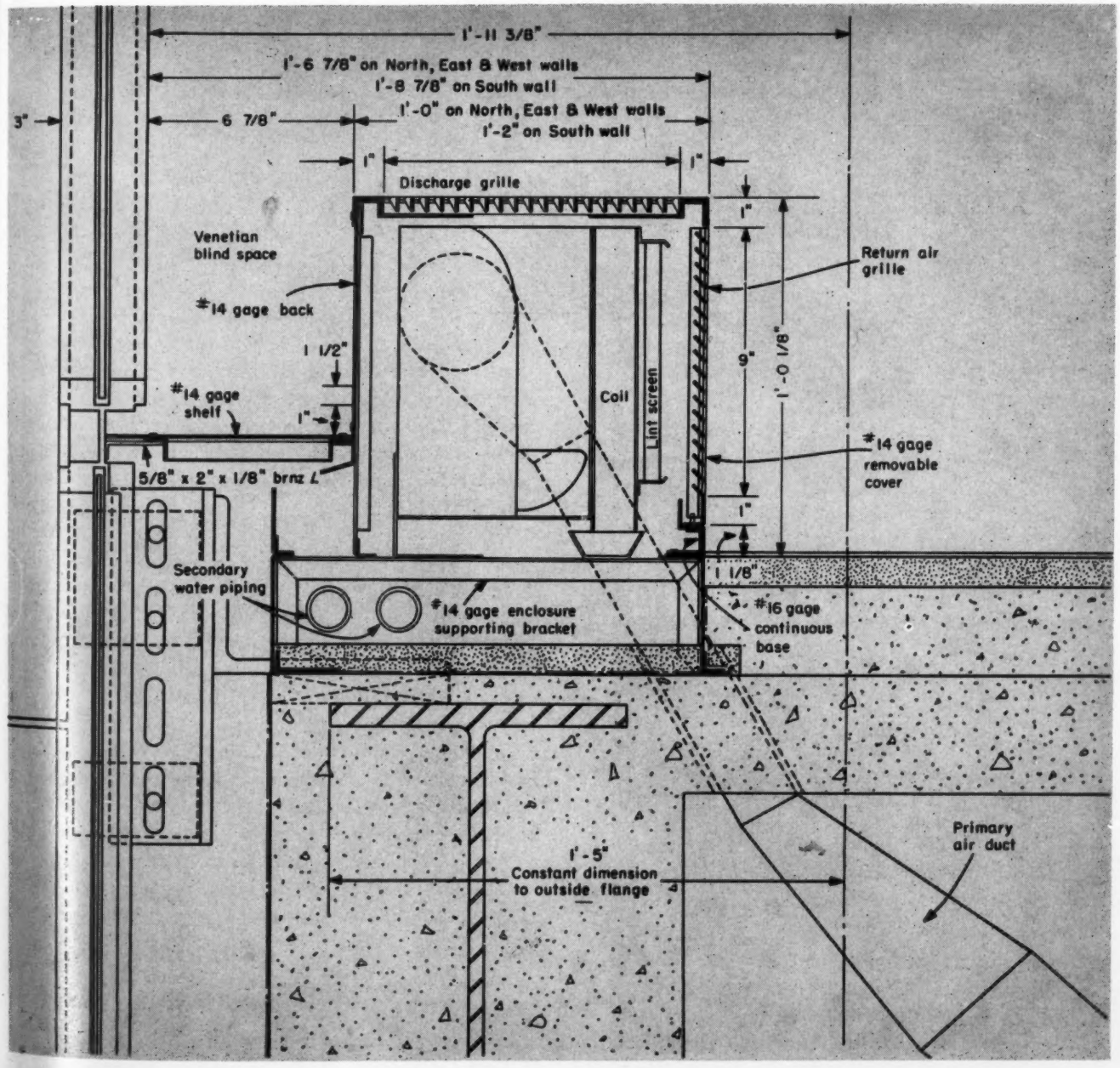
trol. Executive offices, meeting rooms, and other interior areas with special requirements have individual controls. The air-conditioning outlets and recessed lighting are located in the acoustic ceiling in a pattern adaptable to partition rearrangement.

The air-conditioning distribution ductwork is vertical in the interior shafts and horizontal in the hung ceilings of each floor, permitting elimination of vertical ductwork along the wall. Water risers serving the peripheral induction units are run within the H section of each peripheral column.

All mechanical equipment is located in two large machine rooms, one in the subbasement and the other in the double-decked penthouse. This allows maximum usage of floor space. The steam turbine driven centrifugal refrigeration machines and the main condensing water and chilled water pumps are located in the penthouse. The subbasement facilities service the floors up to 19, and the penthouse heating and cooling equipment take care of the upper floors.

The air-conditioning supply air systems have acoustic attenuators to prevent the transmission of air-borne noise to the occupied spaces. Within each machine room, graphic panelboards for the refrigeration system and heat exchanger guide operations.

Before the air-conditioning system was constructed, an experimental office was built to test the equipment under actual working conditions. The office was an exact duplicate of a typical Seagram office, complete with the large window areas and carpet. Temperature conditions, as extreme as they are known in New York City, and the estimated noise from street areas, were reproduced mechanically in the test structure.



CROSS-SECTION THROUGH FLOOR AND WALL OF SEAGRAM BUILDING SHOWING DETAILS OF THE WINDOW UNITS.

Wesley Swadley

A DOUBLE-DUCT SYSTEM PROVIDES CONDITIONED AIR THROUGH PERFORATIONS IN THE CEILING TILES.

American Fore Building - - San Francisco

Buonaccorsi & Murray
Consulting Engineers — Mechanical & Electrical

Graham & Hayes
Consulting Engineers — Structural

Hertzka & Knowles
Architects

One of the most outstanding structures recently completed in San Francisco, California, is the American Fore Building housing the executive offices of the Pacific Department, American Fore Insurance Group. The consulting engineering firms were Buonaccorsi and Murray, electrical and mechanical, and Graham and Hayes, structural, both located in San Francisco.

This seven-story structure of fire- and earthquake-resistive construction has exterior walls finished in Kershaw pink granite. Floors radiate from a central core that houses elevators and stairways. Floor-to-ceiling windows are framed in aluminum. Concrete overhangs serve as sunshades and as walkways for window cleaning. In the general office area, movable bank screen partitions and floor ducts carrying telephone and electrical wiring provide flexibility in arrangement of desks and offices and allow better lighting and circulation of air.

The entire structure is air-conditioned by a high-velocity, double-duct system with the exception of part of the basement storeroom, which is served by a conventional low-velocity system. A double-duct

Wesley Swadley

ALL CENTRAL AIR-CONDITIONING MACHINERY IS LOCATED ON 7TH FLOOR OF THE AMERICAN FORE BUILDING.

Wesley Swadley

THE 7-STORY BUILDING, IN SAN FRANCISCO, IS BOTH FIRE- AND EARTHQUAKE-RESISTANT.

installation was selected for the office floors to conserve story height so that the maximum depth of any horizontal ductwork is only 10 inches.

A central air-conditioning machinery room is located on the 7th floor to permit maximum use of the basement for either storage or garage facilities. Chilled water produced by a 250-hp hermetic single-stage compressor is circulated down through the building to fan rooms adjacent to the elevator shaft on each floor. The air-conditioning system for each floor recirculates 75-percent room air and introduces 25-percent outside air. The outside air, supplied through a vertical duct shaft from a fan located on the 7th floor, is filtered by a continuous automatic fibreglas filter before being introduced to the system.

The air-conditioning system is arranged for exterior zones at each point of the compass plus a central zone. Zones are further subdivided so that partitions for 12-x24-ft offices along the exterior walls and 24-x24-ft office space in the interior can have separately controlled air-conditioning. In the exterior areas, as a result of the high rate of heat gain from floor to ceiling glass and illumination at 35 ft-candle intensity, the air is introduced through special perforated acoustical ceiling tile instead of conventional air outlets. In the interior area, the air-conditioning system will be in operation for the entire 12 months, as high heat gains will be experienced from employee occupancy and the high intensity illuminating system. An advantage of the double-duct system is that one space may be cooled while an adjacent area is being heated.

The heating of the building is accomplished by means of hot water coils in the air-conditioning fan rooms and baseboard heaters installed along continuous exterior windows. Hot water is heated by steam from the Pacific Gas and Electric Company's city mains.

The entire system is under control of an automatic temperature adjusting and indicating installation. Using pushbuttons on a control panel located in the 7th floor machinery room, the operator can read temperatures at 48 points throughout the building.

ARCHITECTURAL RENDERING OF THE NEWLY COMPLETED SHERATON HOTEL IN DOWNTOWN PHILADELPHIA, PA.

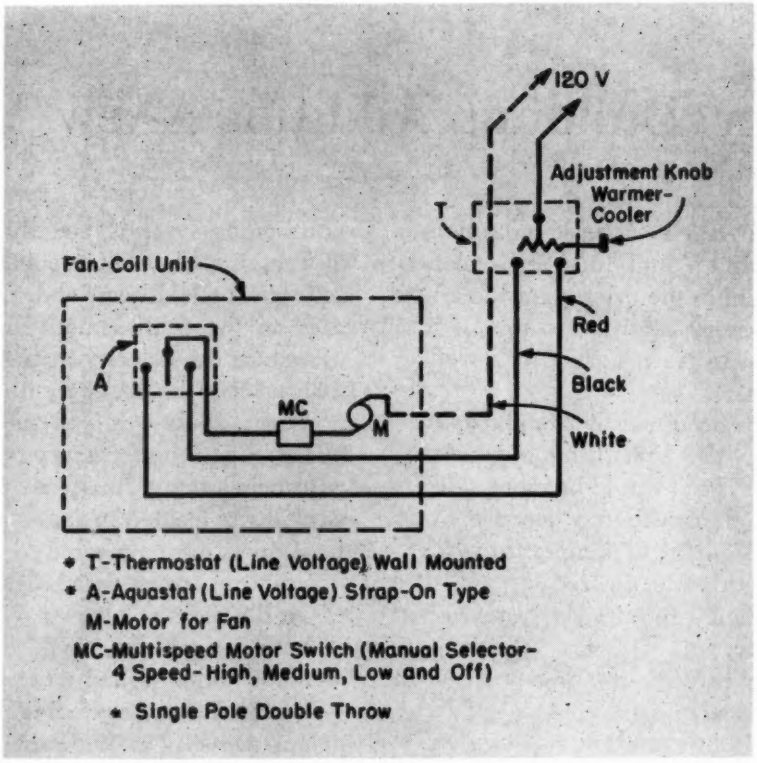
Slocum & Fuller
Consulting Engineers

Perry, Shaw, Hepburn & Dean
Architects

Sheraton Hotel--Philadelphia

EACH GUEST ROOM IN PHILADELPHIA SHERATON HAS ITS OWN FAN-COIL UNIT AND THERMOSTAT.

CLOSE-UP VIEW OF A FAN-COIL UNIT WITH FRONT REMOVED. FAN DRIVES ARE MANUALLY PRESET MULTISPEED MOTORS.



DRAWING SHOWS SIMPLIFIED WIRING DIAGRAM FOR THE FAN-COIL ROOM UNIT AND THE ADJUSTABLE THERMOSTAT.

When Slocum & Fuller, Consulting Engineers, undertook the design of the air-conditioning for the guest room areas of the Philadelphia Sheraton, newest in the Sheraton chain hotels, detailed estimates were prepared for each of the several possible methods, and it was shown that the fan-coil heating and cooling system plus supply and exhaust ventilation at that time was lowest in first cost.

The building skin is porcelain enameled steel, and the use of louvered openings in the exterior for fresh air intakes to each fan-coil unit was ruled out, partly because of cost and appearance but especially because the building height and the resulting wind loading on the building face made it impossible to predict the volume of air that might be supplied by these openings. Therefore, the individual units were designed to operate totally on recirculation of the room air, and no air intakes were used.

A positive exhaust system ventilates the interior guest room bathrooms. Because the fan-coil room units operate on recirculation, this bathroom ventilation air is supplied by the corridor supply system and by infiltration through the room windows.

Each fan-coil room unit is equipped with a four-position, three-speed, manual selector switch. After installation was completed, this manual switch was set by the contractor to the proper speed for each unit, depending upon room orientation and occupancy load. From that point on, room conditions were maintained automatically by means of an adjustable, single pole, double throw thermostat mounted on the wall.

On the cooling cycle, a rise in room temperature causes the fan to run; on the heating cycle, a drop in room temperature actuates the fan. The change-over from cycle to cycle is accomplished automatically by a sensing element on the flow water pipe to the guest room unit.

The finned coil mounted in the top of the unit is used for both heating and cooling. During the cooling season, chilled water from a central refrigeration plant is circulated through mains and risers. During the heating season, these same mains and risers are used to conduct heated water.

With approximately 1000 fan-coil units on the job, power factor had to be investigated. Motors offered as standard equipment have a lagging power factor as low as .45, which would have been intolerable. At a slight additional cost per unit, motors having a power factor of .85 were specified.

The total installed cost for the complete heating, ventilating, and air-conditioning systems, including guest room and public spaces air-conditioning, central refrigeration plant, and the heating and ventilating of all work spaces, came to approximately $2000 per guest room.

U. S. Rubber Building Addition--New York City

Syska & Hennessy Inc., of New York, used induction-type window units and a dual-duct, high-velocity, air-conditioning system in their design of the air-conditioning for the 19-story addition to the U. S. Rubber Building, located in New York City's well-known Rockefeller Center.

For the large area to be occupied by Standard Oil Company of New Jersey, the consulting engineers found that the dual-duct system would be more satisfactory than other methods considered because:

¶ It provided individual control of temperature for the interior areas where this was desired.

¶ Various types of occupancy required a system offering complete flexibility.

¶ The high velocity of air through the duct-work allowed a savings in shaft space.

The U. S. Rubber Building addition has two air-conditioning systems, each having a capacity of 43,000 cfm, supplying hot or cold air to the interior areas. The fans, coils, filters, and allied equipment are located in the subbasement and on the eighth floor.

Because the velocity in the system is high — from 2800 to 3300 fpm in supply ducts, and up to 2000 fpm in return ducts — it was necessary to insulate the ducts to avoid unnecessary noise.

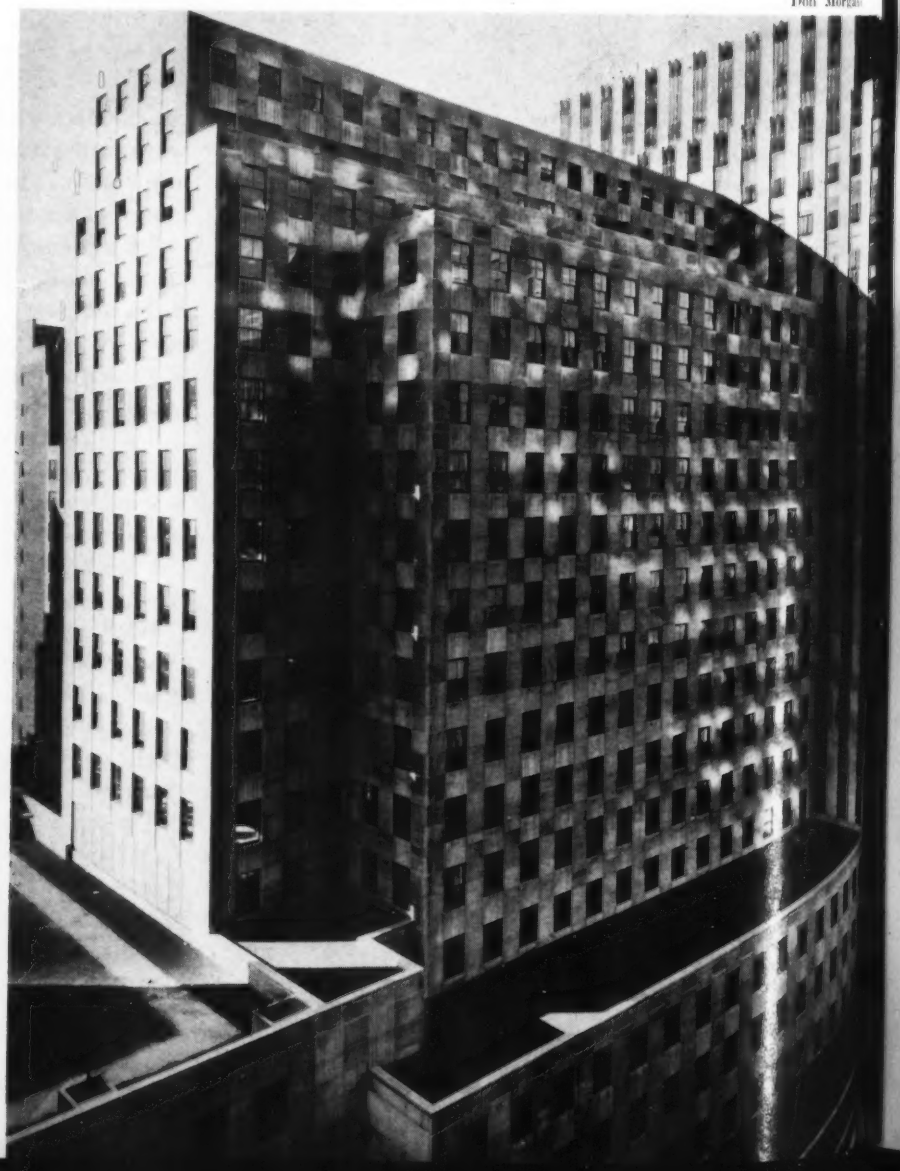
Branches were run from the cold and warm air trunk ducts located in shafts at each floor. Taps from these ducts are connected to dual-duct constant volume mixing boxes, which discharge into room registers or diffusers.

The mixing boxes, with cold air entering at between 50 and 65 F and meeting the warm air heated to 70 to 80 F, also screen the noise resulting from the high air velocity in the branch ducts.

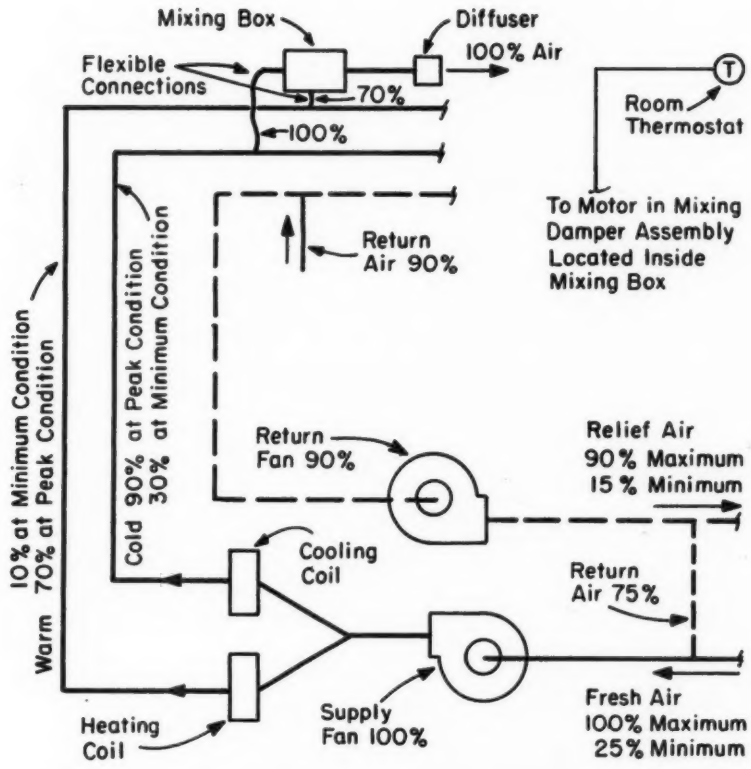
Syska & Hennessy
Consulting Engineers

Harrison & Abramowitz
Architects

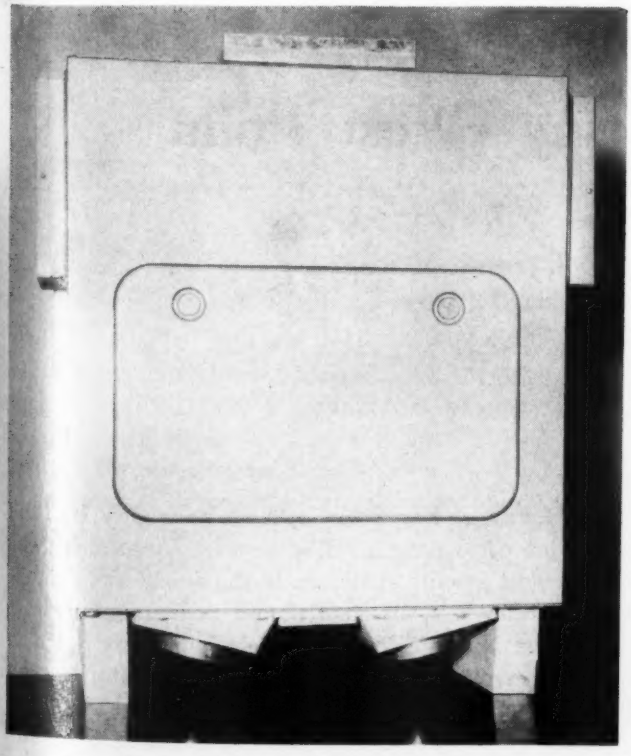
Don Morgan



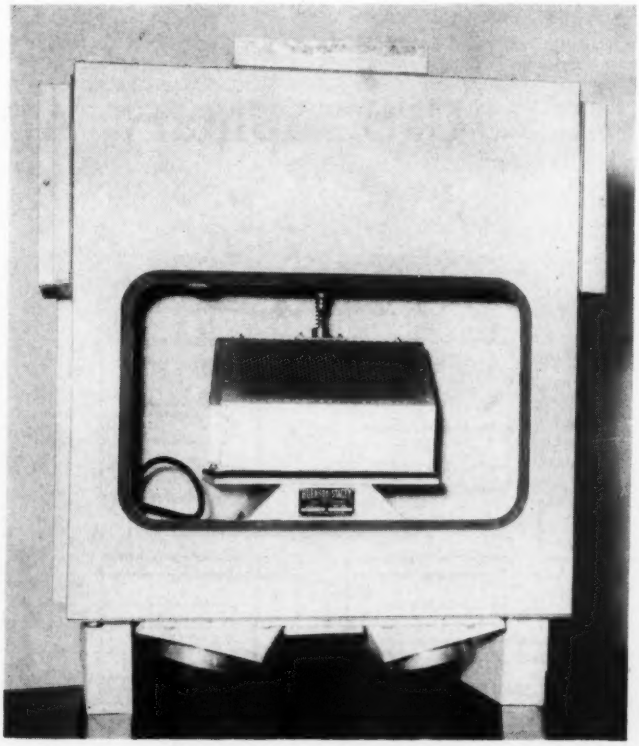
VIEW OF THE NEW 19-STORY ADDITION TO U.S. RUBBER BUILDING IN NEW YORK'S ROCKEFELLER CENTER.



SCHEMATIC DIAGRAM FOR THE AIR-CONDITIONING SYSTEM INSTALLED IN AREA TO BE OCCUPIED BY STANDARD OIL (N.J.).



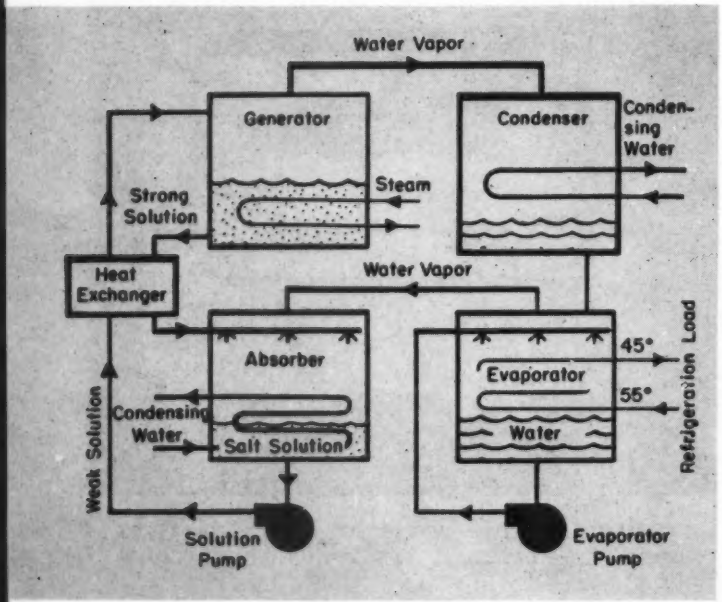
BRANCHES FROM COLD AND WARM AIR TRUNK DUCTS FEED DUAL-DUCT CONSTANT VOLUME MIXING BOXES.



COLD AIR ENTERS BOXES AT 50-65 F, MEETING WARM AIR HEATED TO 70-80 F IN HEATING COILS.

THE OLD RIDING ACADEMY AT WEST POINT HAS BEEN TURNED INTO AN AIR-CONDITIONED ACADEMIC BUILDING.

U. S. Military Academy -- West Point



Carrier

THE ABSORPTION SYSTEM SELECTED FOR WEST POINT USES EXHAUST STEAM FROM POWER PLANT TURBINES.

Guy B. Panero
Consulting Engineers

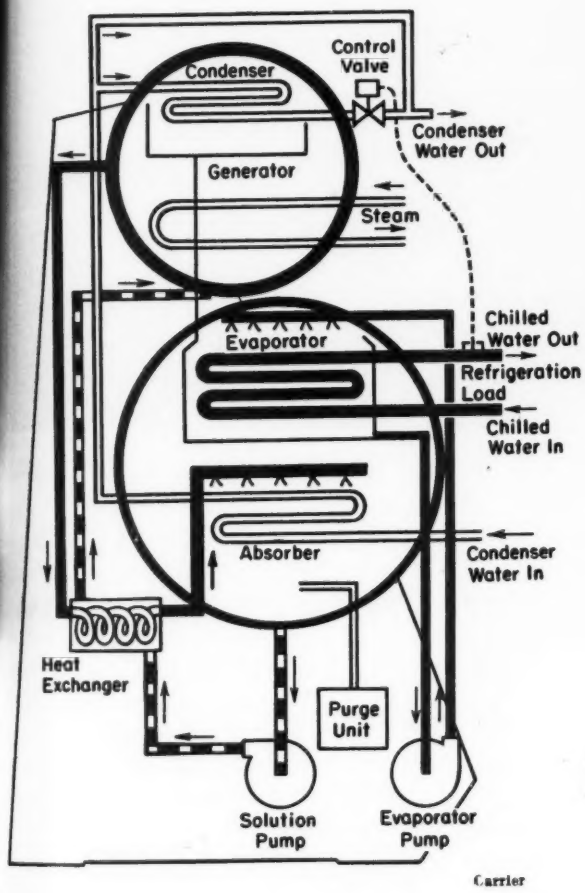
Gehron & Selzer
Architects

Guy B. Panero Engineers, of New York City, had the job of turning a riding academy that once was the largest granite structure in the world into a modern, windowless, air-conditioned, academic building.

At the U. S. Military Academy in West Point, a project involved the construction of laboratories, two auditoriums, departmental staff offices, and 190 classrooms within the shell of the old building, to maintain the architectural consistency of the campus.

After detailed equipment studies, the Panero firm recommended to the government that steam operated

OLD ACADEMY WAS REMODELED TO PRESERVE THE ARCHITECTURAL HARMONY OF THE WHOLE SCHOOL.



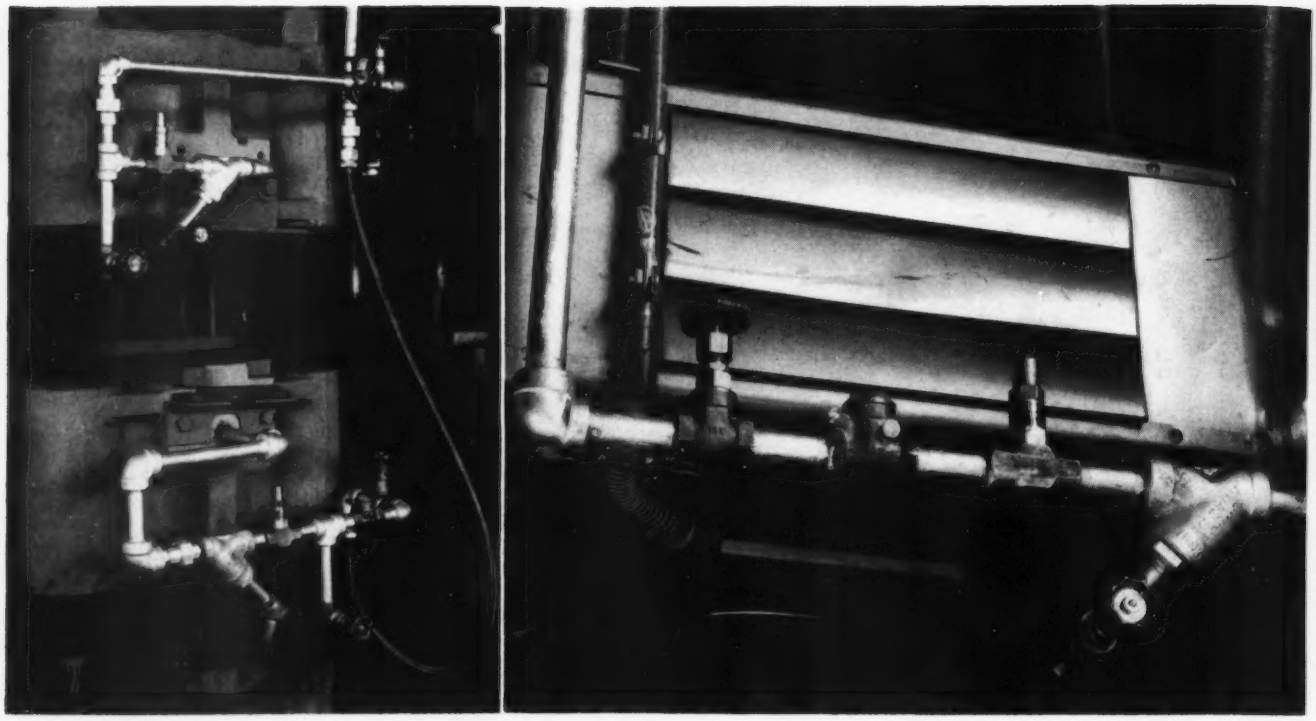
THE WEST POINT INSTALLATION USES TWO, 350-TON AUTOMATIC ABSORPTION REFRIGERATION MACHINES.

refrigeration machines be purchased for air-conditioning. The West Point equipment selection was based on the fact that the Academy, located on a large government reservation in midstate New York, had no economical source of obtaining additional electrical energy. However, exhaust steam from turbines was available, so it was used as the heat source in the refrigeration cycle. The air-conditioning equipment was located conveniently in an old coal storage room above the boiler room.

Two, 350-ton automatic absorption refrigeration units were specified for the project. These machines, which utilize tap water as a refrigerant and a simple salt solution (lithium bromide) as an absorbent, operate on low-pressure steam of 12 psig, providing 45 F chilled water with 85 F condensing water. Nominal steam rate for the units is 19.4 pounds per hour per ton. A direct line from the Academy's boilers is available to supplement the supply of exhaust steam under peak operating loads. River water is used as condenser water for machines' refrigeration cycle.

The two, 350-ton units supply chilled water to the central station air-conditioning systems serving the classrooms and to the separate systems for both the lecture hall and a large auditorium. Classroom systems use medium high pressure supply air through a double-duct arrangement; one duct carrying hot air, the other duct carrying cool air. Each classroom with this system has individual room control by adjustment of the quantity of cool and warm air being supplied through ductwork in the illuminated ceilings.

The lecture hall and auditorium are served by their own low pressure, conventional air-conditioning systems. The units for each of these rooms include filters, water cooling coils, preheaters, reheaters, and supply fans.



LEFT—FIBER-FORMING PRESS WITH INDIVIDUALLY TRAPPED PLATENS. RIGHT—TYPICAL UNIT HEATER RETURN LINE.

Techniques in Specifying Steam Traps

WILLIAM J. FADDEN, JR.
Chief, Mechanical Department
The Kuljian Corporation

and

JOHN W. WELKER
Application Engineer
Yarnall-Waring Company

CASUAL EXAMINATION of a steam trapping problem indicates that simple selection of a trap by type and size is enough. While selection ultimately resolves into these two basic factors, much more must be considered. A trap is small and relatively inexpensive when compared with the over-all process, but it has such an important part in maintaining efficiency that its careful and proper selection cannot be overlooked.

By definition, a steam trap is an automatic device for draining condensate and removing air from space where steam condenses. To insure a successful installation, a trap normally must:

¶ Drain condensate as soon as it is formed so as to maintain maximum heat transfer and prevent water hammer and other hazards from "slugs" of water.

¶ Eliminate air to maintain maximum heat transfer, prevent steam dilution, and help prevent corrosion.

¶ Prevent escaping of steam from the equipment.

How can these requirements best be met? Proper and complete specifications are the answer.

Before a trap is selected a study should be made of all types. There are many references, including trap catalogs, which provide valuable descriptive and application data. No one trap is suitable for all services, and the study should determine the best trap type, the proper size, and the proper installation and maintenance procedure. Here is a list of factors that should be examined when specifying steam traps for a given application.

Amount of Condensate

There are standard prescribed methods for calculating condensate rate by the use of formulae, charts, or tables. Many manufacturers detail these data in their steam trap catalogs. The calculated load is expressed in pounds per hour. This load value then is multiplied by an appropriate safety factor to take care of start-up load, variations in steam pressure, unpredictable and abnormal operating conditions, and discrepancies between assumed and actual data. The result is compared with trap rating tables to establish the size of the trap at a given pressure.

It is important that the desired condensate discharge temperature be considered. It is generally, but not always, desirable to discharge condensate close to steam temperature. Care should be taken to examine the temperature base on which a trap rating table is designated, otherwise the trap size selected may be inadequate because some tables are based on cold water capacities. The curves in Fig. 1 show why discharge temperature is a real factor in determining how much a trap can handle. These curves are based on data obtained from test of a standard fixed area orifice through which condensate is passed at varying temperatures and pressures.

Amount of Air

The removal of air or other gases by a steam trap is second in importance only to condensate removal. When steam is first admitted to heat transfer spaces, the air that filled these spaces must be driven out before efficient heat transfer can be accomplished. This must be done either through manual venting or steam traps. Following the start-up cycle small quantities of air which enter with the steam or are introduced otherwise into the system must be removed continually. The presence of air mixed with steam will cause a reduction of steam temperature and reduce the heat transfer efficiency. This phenomenon can be explained by Dalton's law of partial pressures.

Air in any quantity in a steam heat transfer system is detrimental in one way or another, so the air quantities to be handled during start-up and normal operation should be studied along with the air-handling characteristics of the trap. Many types of traps are capable of handling large amounts of air, but some require auxiliary features such as thermostatic air vents to assure adequate air-handling capacity.

Time for Heating Equipment

The rate of formation of condensate on start-up is usually many times that of normal operation. If heat-up time is to be kept to a minimum, a trap with a capacity far in excess of that required for normal operation must be used, and it should be sized for the rate of condensate removal desired during start-up.

Type of Discharge

Some traps have discharge characteristics which are cycling or intermittent; others discharge continuously. In many applications intermittent discharge is satisfactory, but where condensate is to be removed immediately as it is formed, continuous discharge is required.

Pressure at Trap Inlet

All trap capacities are a function of pressure, and the pressure at the trap inlet must be known. This pressure can be appreciably less than the boiler steam pressure. When pressure at a trap varies considerably, there are some traps that will not function satisfactorily. Some are manually set to close at a fixed temperature. At a constant and fixed pressure, this can be a desirable point (a selected number of degrees below steam temperature), but if pressure falls, the trap can remain open on steam. Conversely, if the pressure rises the trap will close prematurely. Traps that operate on a mechanical leverage principle are limited to application within a definite range of pressure. Beyond this range it is necessary to change internal parts to compensate for pressure and allow the trap to continue to operate.

Pressure of Return System

Pressure of the return system is important in two ways. If this pressure is appreciable, the differential pressure across the trap should be used to calculate capacity. Also, if the return pressure is high, expressed in percentage of line pressure, certain traps will not operate correctly.

Temperature Range at Trap Inlet

All traps are designed to operate on normal saturated steam temperature, but some traps are generally not recommended where superheat exists.

Ambient Temperature Range at Trap

Normal external temperatures are not significant, but freezing temperatures are. Most traps will oper-

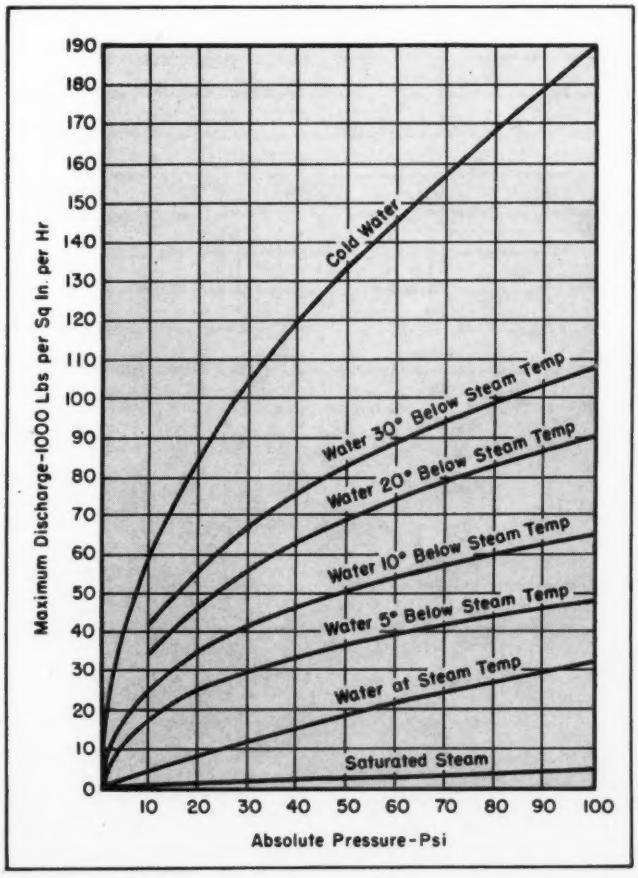


FIG. 1—DISCHARGE VARIATIONS WITH TEMPERATURE.

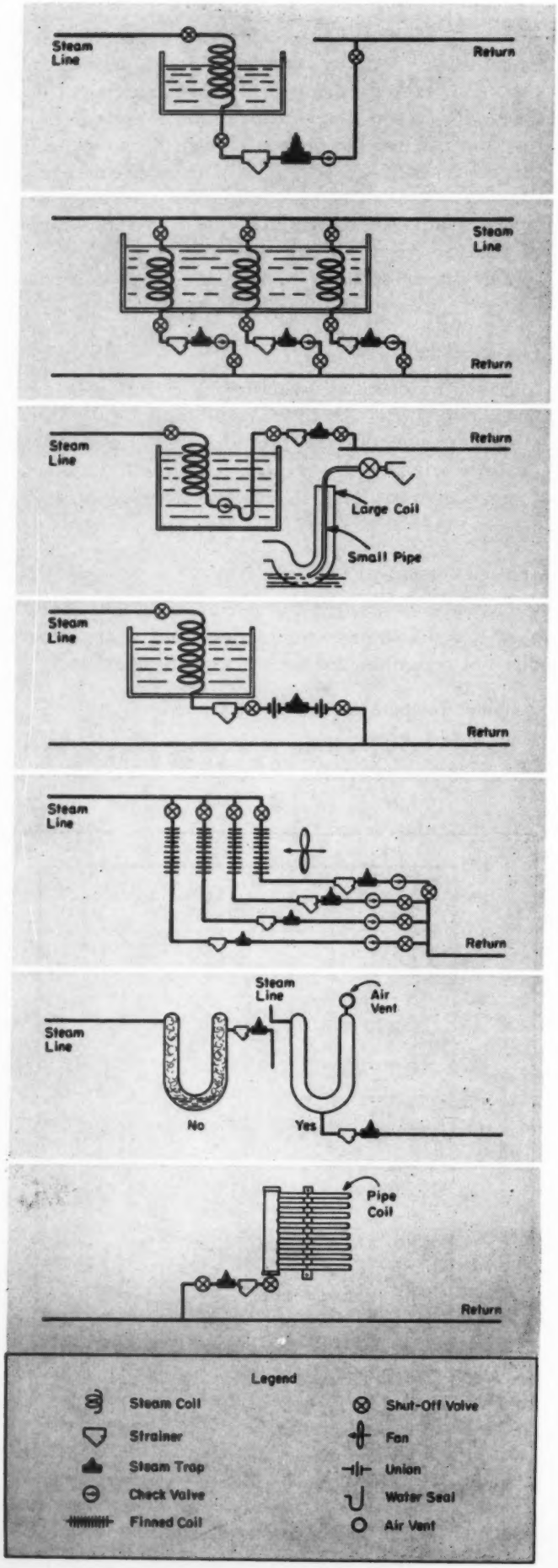


FIG. 2—COMMON TRAP INSTALLATION ARRANGEMENTS.

ate in freezing temperatures providing they operate continuously. If the steam pressure is shut off during freezing conditions, a trap that is self-draining must be used to prevent damage.

Type of Load

Generally, the condensate rate to be handled is relatively constant once the equipment being drained is up to operating temperature. Unless abnormal requirements are desired on start-up load, a trap can be sized for the normal average operating load. On some installations the load is cyclic — very heavy then very light. It is necessary here to size for the heavy phase rather than the average load. This type of application cannot be covered adequately by safety factors alone.

Space and Weight Limitations

Traps with equal capacity ratings can vary considerably in size and weight. Some traps that depend on metallic expansion and contraction for opening and closing can be excessively long. Another type if called upon to discharge condensate near steam temperature must be located some distance from vessel being drained to provide a "cooling leg" between trap and vessel that will assure positive trap closure.

Condensing Surface of Equipment

Occasionally heat exchange equipment contains heat transfer surface in excess of that required. This results in heating a given quantity of material in less time than that shown in process calculations, and condensate forms at a rate in excess of that expected. For highest efficiency condensate should be withdrawn at the same rate that it is formed. Whenever these conditions are suspected, the load should be calculated on the basis of the actual surface being used rather than on process design data.

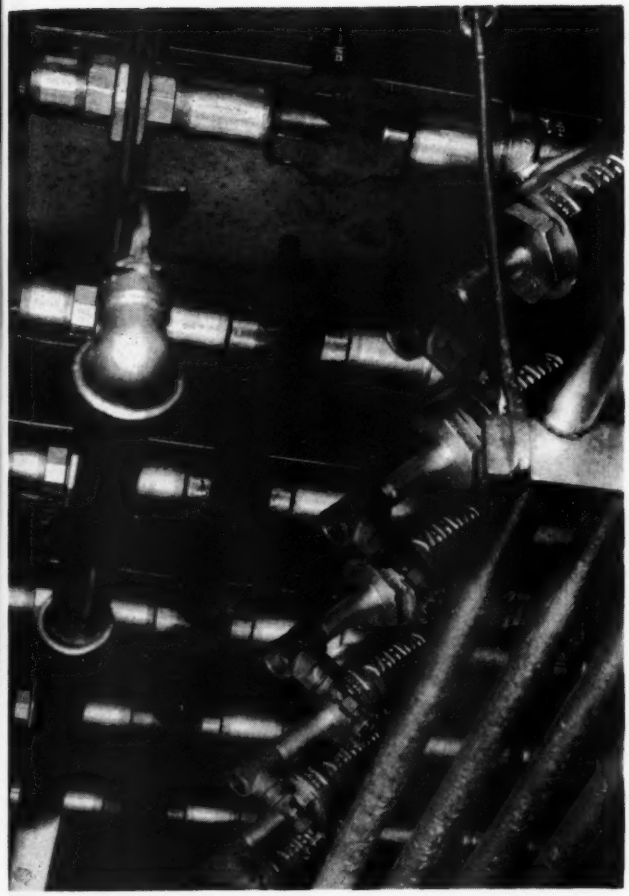
Cost Factors

First cost is a very important factor but low first cost can only be advantageous if operating and maintenance costs are in line. Some traps can be installed readily in any position and in any location. Others have limitations in this respect which increase installation costs.

Generally, the more moving parts, the higher the maintenance costs will be. Some traps can be serviced under pressure, others cannot. Some must be removed from the line, others can be completely and simply repaired in the line. These and other operational characteristics determine maintenance costs.

Factors of Safety

Factors of safety are discussed in trap catalogs. A factor of safety is used as a multiplier of calculated condensate load to determine the required trap capacity at a given operating pressure. Most trap manufacturers recommend factors between 1 and 3. Others



SIX, 1½-IN. IMPULSE STEAM TRAPS AND STRAINERS IN RETURN LINES OF JACKETED COOKING KETTLES.

go as high as 5. Usually the higher the factor, the larger the trap required.

Size of Drain

The size of the drain on the apparatus should not be used for trap selection. The trap size should be determined independently. Using the drain size alone can result in improper sizing.

Installation Hook-Up

Proper installation is equally as important as proper selection. Several common hook-ups are shown in Fig. 2 as a guide to specifying. Here is a list of general installation recommendations, all or part of which can be included in specifications. Some manufacturers may modify these, but generally they are accepted as sound.

¶ Install at accessible location.

¶ Install at lowest point of system.

¶ Use fine mesh strainer with blowdown valve ahead of trap.

¶ Blow out piping under full steam pressure before installing trap.

¶ Check directional markings on trap bodies or nameplates.

¶ Install shut-off valves on either side to enable isolation for maintenance when required.

¶ Install one trap on each coil or each unit of equipment being drained.

¶ Where condensate must be lifted, install check valve between trap and riser.

¶ Pitch horizontal inlet lines to traps to keep them full of condensate and prevent steam binding and water hammer.

¶ With most designs install trap as close as possible to equipment being drained.

¶ When more than one trap drains into a common return line, install a check valve between each trap and the return to prevent reverse flow in case one or more units are shut down.

¶ Install unions on either side of trap to facilitate removal.

¶ Never use pipe smaller than trap connection size.

¶ The return line should be no higher above the trap than the level to which the lowest line pressure can lift condensate. Multiply lowest line pressure by two to determine the maximum height in feet.

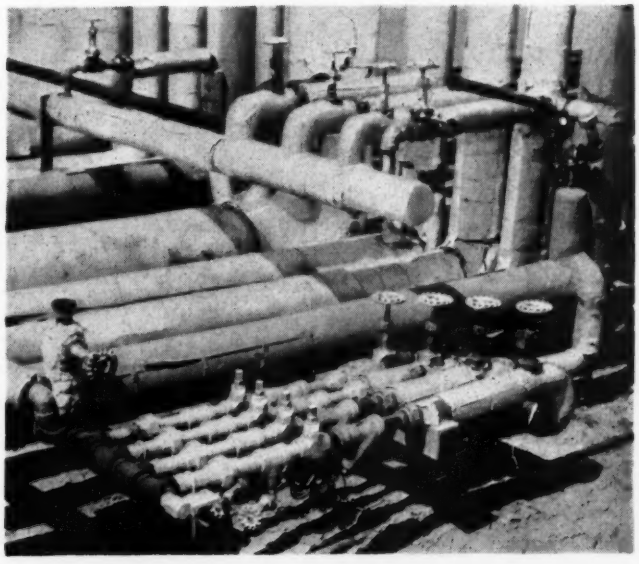
¶ Install larger traps on the first and possibly the second coil of a number of coils which are in series with respect to air flow through them.

¶ Install a water seal to prevent steam binding when the trap can only be installed above lowest point in apparatus. Water seal should be combined with check valve to prevent back-flow.

¶ Install a return line large enough to prevent excessive back pressure.

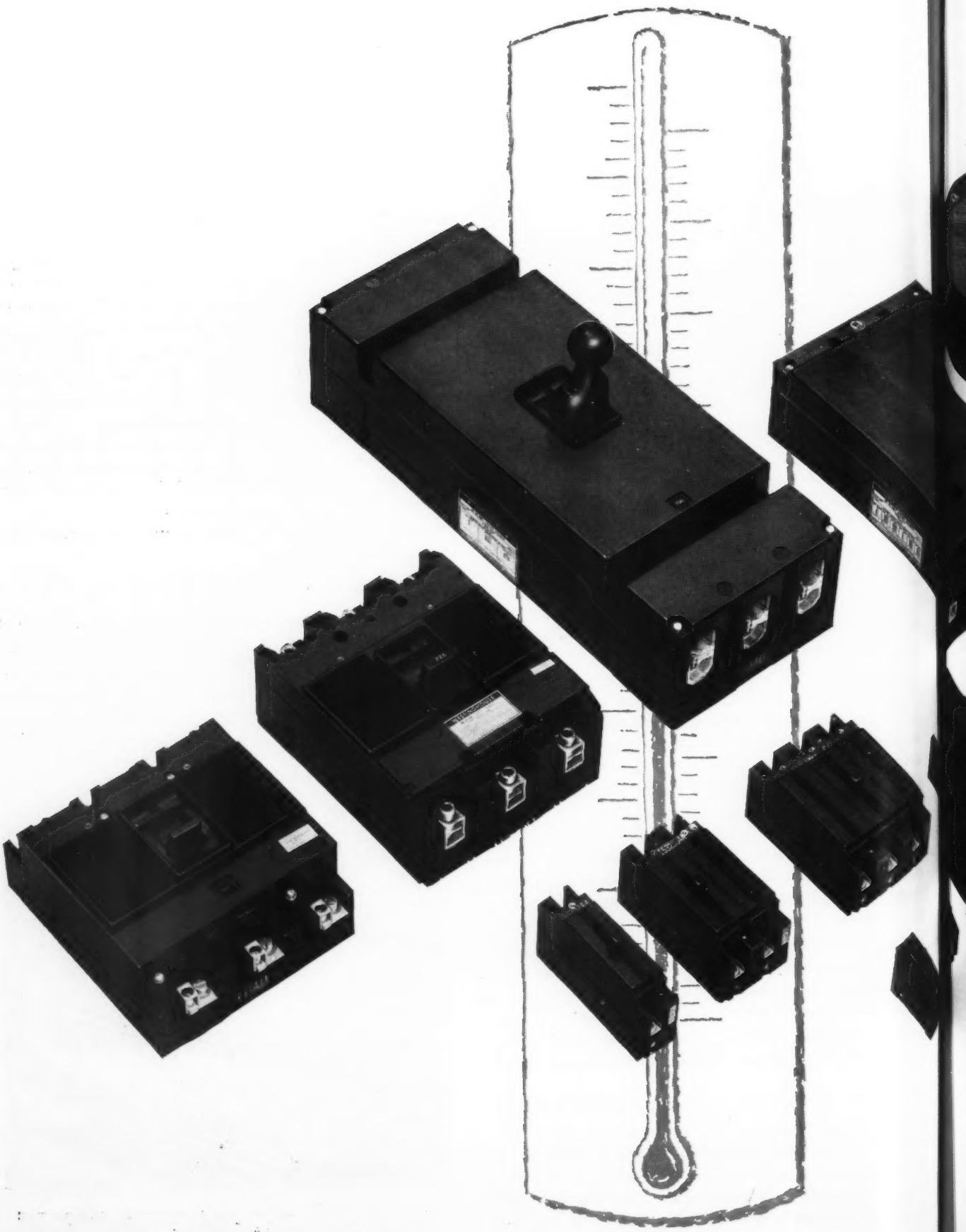
Conclusion

The larger the installation, the more detailed should be the analysis and study of all designs. Traps can cause much trouble if improperly selected or installed. Actually, they should give no more trouble than any other equipment when care is taken in their specification. ▲▲



OUTDOOR INSTALLATION AT A REFINERY WHERE THE TRACER LINES DISCHARGE INTO A COMMON HEADER.

The only complete line of



# of ambient compensated breakers . . .

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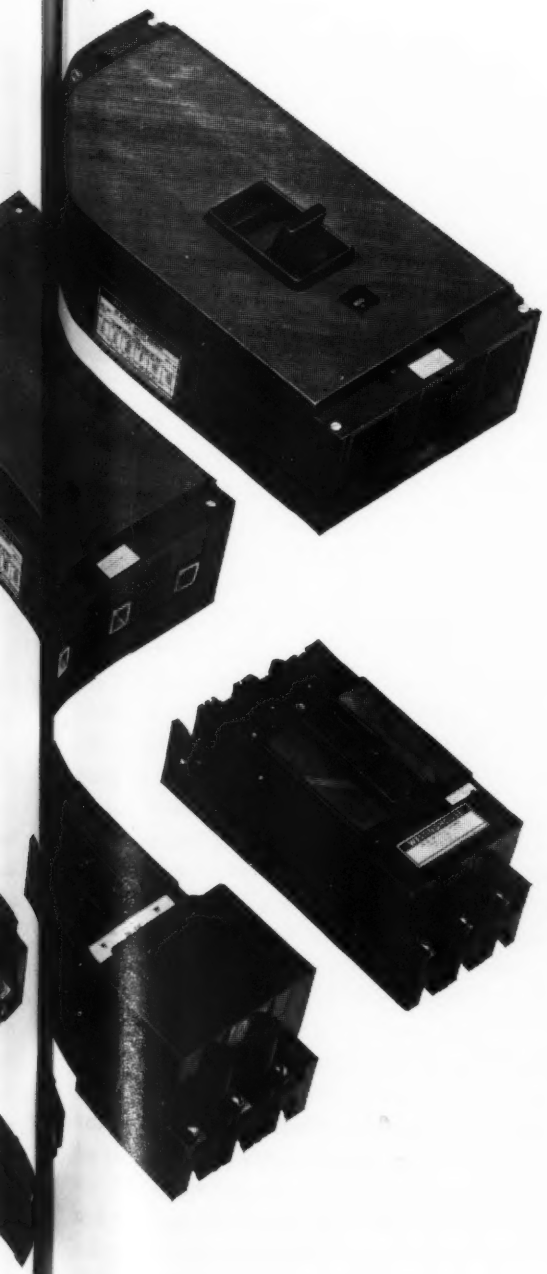

Whenever circuit breakers are subject to wide ambient temperature variations to which associated conductors are not exposed, an ambient compensated type of breaker should be specified. This provides added insurance against current interruptions due to false high-temperature influences. The net effect is to prevent the breaker from unnecessarily derating the conductors.

Typical of the conditions under which ambient compensation may be required are . . .

In panelboards or load centers where a large number of closely grouped breakers create high temperatures.

Proximity of breaker installation to other equipment causing ambient variations to which the conductors are not exposed.

Westinghouse has the only complete line of circuit breakers to meet every requirement. (1) "Compensated for enclosure ambient," standard in Quicklag® breakers, (2) "Noncompensated for ambient re-rating," standard in Types E through M, (3) "Ambient compensated," by specification in Types E through M.

The engineering "know-how" which goes into the development of this reliable protective equipment is available to aid you in selection of the right type of breaker for your particular circuit conditions. Ask for Westinghouse Bulletin 7221 detailing technical information on the choice of circuit breakers.

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Entertainment, Travel, and Your Income Tax

CARL H. RISTAU, C.P.A.
Kovtan & Ristau

Carl H. Ristau is a graduate of the University of Wisconsin and a Certified Public Accountant. From 1941 through 1952 he was a Revenue Agent for the U. S. Treasury Department, dealing with income tax matters. For the last five years he has been in private practice, and for the last three years he has been associated with John Kovtan in the firm of Kovtan & Ristau, C.P.A.'s.

CE exclusive

WHETHER YOU OPERATE as a sole proprietor, a partnership, or under a corporate structure, you may be sure that in the event of an income tax examination, one item the Revenue Agent will go into is the travel and entertainment account. How well you will fare will depend more upon what you already have in the way of records than on what you hope to be able to convince the agent.

No Rule of Thumb

You, as a consulting engineer, are in a personal service business, and your travel costs — perhaps even your entertainment costs — will be higher than most other lines of endeavor. Do not, however, be lulled into a feeling of security if your total claimed deductions do not exceed a certain percentage of your gross income. There is no rule of thumb.

To jar you from any complacency that may have crept into your thinking, the Internal Revenue Service says in IR-Circular No. 57-85, dated June 20, 1957, "For some time our field agents have been alerted to abuses by income taxpayers in claiming deductions for travel and entertainment which could not be justified as ordinary and necessary business expenses. We have been taking a close look at expense deductions claimed involving such items as club dues, entertainment, travel, maintenance of automobiles, yachts, and airplanes, maintenance of company supported residences, and so forth.

"One area which requires close attention involves the use of alleged branch offices established in resort cities for the sole purpose of sending business executives to such cities for vacations. Other instances involve deductions for the expenses of purported business trips by executives vacationing at resort hotels, expenses of hunting trips, expenses of attendance at sporting events in distant cities, and for other nonbusiness purposes, under the guise of necessary business trips.

"We obviously have no desire to tell taxpayers how to spend their money, but we cannot permit expenditures to be deducted for tax purposes without proper justification. With this in mind, you are requested in the process of your audit of income tax returns to scrutinize expense accounts closely for abuses such as those outlined above and others of similar character."

The consulting engineer who is a principal in his firm is in a position both of incurring the expense and allowing the reimbursement. He should be in a position to substantiate his actions to the Internal Revenue Service.

What is Deductible?

The general rule for deductions is that the expense must be incurred in connection with the operation of the business, in pursuit of business, with a

business purpose rather than a personal one, and that it must be ordinary and necessary.

Travel expense covers all transportation costs such as rail, pullman, air, steamship, and bus fares, baggage transfers, porters, taxicabs, tips, and the cost of maintaining and operating automobiles or airplanes for business purposes.

If the travel is "away from house" the deductible items include meals, hotel rooms, tips, wires, telephone, and stenographic services. Home, for tax purposes, is your principal place of business rather than your residence. There is one court decision involving a taxpayer who owned corporations operating in 26 different cities. His main office was in Cleveland although he spent most of his time in New York City, where he maintained a three-room apartment the year around. He was allowed $1800 of the $2400 yearly rental as part of his travel expense on the assumption that "home" was in Cleveland.

There is a difference between the Internal Revenue Service and the courts in their interpretation of "away from house." The Revenue Service holds you must be away over night, whereas the courts say that your trip need only take you to another town or city even though you return the same day.

Consulting engineer Jones leaves Chicago on Monday for St. Louis, conducts his business, and returns Tuesday. Consulting engineer Smith flies to Milwaukee, conducts his business and returns that evening. The Internal Revenue Service holds that while both Jones and Smith may deduct their transportation costs, only Jones may deduct his meals and room. The courts hold that both may deduct their meals. So if you claim your meals on one-day trips, you may have to go to court to get your deduction.

Deductible entertainment expenses cannot be listed completely since practically every conceivable type of entertainment has been allowed to one taxpayer or another who could prove the business justification. You probably have costs of meals and drinks; tickets for sporting events, club shows, and theater; upkeep of yachts, hunting lodges, and vacation camps; and expenses of social clubs maintained for business entertainment.

Entertainment normally involves present or potential clients, but there have been incidents in which the deduction was allowed for entertaining in order to get special attention in selection of materials and their delivery. Expenses of providing social activities for your own employees are also deductible.

Mixing Business and Pleasure

The entertainment could take place in your home; however, here you would have to prove it was for business purpose rather than social. These costs would include such items as: catering services, food and drink, extra servants, transportation of guests, proportionate part of your fuel, light, water, telephone, repairs, insurance, taxes, general upkeep of the home, depreciation of the house, and operating cost of a family car made available to business guests.

The Internal Revenue Service is looking into combined business-pleasure trips — such as timing of a conference with a Bowl Game or the World Series. They will look to see if the trip was primarily for business or pleasure, and if it was primarily for pleasure, no deduction will be allowed even if the taxpayer participates in some incidental activity re-

lated to his business. If the trip is primarily for business, then only expenses for sightseeing, side trips, and visiting and entertaining which have no relationship to the business will not be allowed.

CONSULTING ENGINEER Magazine arranged and conducted a European Tour, in 1956, for consulting engineers from this country. This was a 30-day trip, covering five countries, and the itinerary and purpose leave no question but that the tour was primarily for business. This magazine now is arranging a similar tour, the costs of which, exclusive of any over and above side trips, personal in nature, should be deductible under the Internal Revenue Service's present rule.

If you take your wife along on a business trip, you should not deduct the expenses of taking her along. The Internal Revenue Service will not change its attitude even though she renders minor incidental services such as typing notes or accompanying you to business luncheons or dinners. However, you need not prorate the transportation costs if you used a family travel rate. For example, if the train fare for you and your wife was one and one-half times the single fares, you may deduct the full single fare instead of being limited to half the total cost.

Membership Dues

While membership dues in business and professional clubs are normally deductible, there still must be proof of business benefit. The Tax Court disallowed a businessman his Kiwanis Club dues where this proof was absent.

Social club dues can present borderline cases. These dues will be considered as personal expenses unless the business connection is clearly shown. If you would maintain a club membership regardless of business, you have a greater burden of proof in sustaining your deduction. Bar and dinner bills also must have a business connection to be deductible.

One word of caution. There is a Tax Court decision known as the Richard Sutter case, which holds that the cost of meals or entertainment applicable to the taxpayer himself are deductible only to the extent that they are greater than would normally have been spent. Just how or to what degree the Revenue Service will apply this theory is not currently known. It does raise questions. If you take a client to luncheon, must you show the difference between the cost of your meal and what you would have spent if alone in order to get any deduction for your own meal? Or if you take your client to the theater, must you prove you would not have gone to that particular play in order to be able to deduct the cost of your own ticket?

Expense Reimbursements

It is recommended that you have your employees submit expense accounts for their cash outlays and reimburse them accordingly. If you have to advance funds to an employee, have him return any unexpended sum or pay him for any additional sum expended as reflected by his expense account.

This is advantageous to the employee in several ways. He should include the reimbursement on his tax return; but he offsets this with his cash outlay backed up by a company approved expense account. Likewise this would not jeopardize his use of the optional standard deduction, thereby insuring him maximum tax deductions.

This method also has an advantage to the employer, for in the event any payment is not allowed as an expense reimbursement, it will be allowed as additional compensation. Handled in this way, your employees will not create a tax problem on travel and entertainment. But you, as a principal in your firm, can.

Wherever possible, use your firm's credit. Use the credit plans offered by your local club, bar, garage, airlines, oil companies, hotel chains, travel agencies, and diners clubs. Your firm will pay the bills directly and your statements will be your receipt.

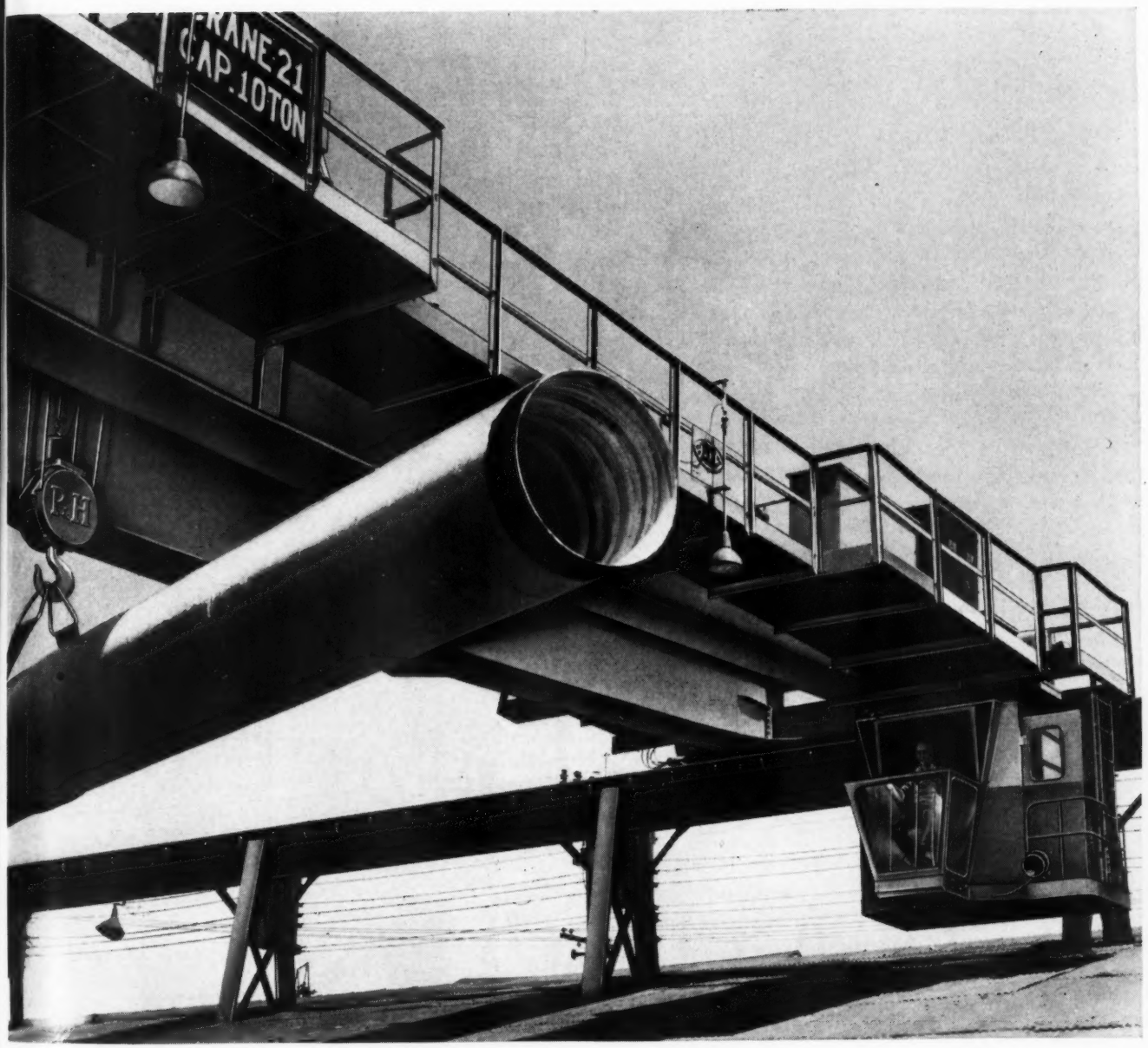
Require at least as much of yourself as you do of your employees in the way of expense accounts.

The Revenue Service will expect you to subject your own expenses to the same scrutiny that you do your employees. This is only right since you are in the position of approving any items or amount you would otherwise care to claim.

Hence, for all disbursements that do not lend themselves to use of your firm's credit, reimburse yourself just as you do your employees. This applies even if you are a sole proprietor, since you should maintain a personal checking account separate from your business account.

Never draw checks to "cash" in round amounts merely labeling the check stubs "travel." This method is a favorite target of the Revenue Agent and one that leaves you in an extremely vulnerable position when asked to substantiate your claim.

Our tax law places the burden of proof upon the taxpayer for any deduction taken. It is not the duty



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ot the Revenue Agent to show you did not spend the money for the purpose claimed; it is for you to prove you did.

What Proof Should You have?

If your firm is incorporated, and you are a principal stockholder-employee, you not only are going to have your expenses closely examined, but if any part is disallowed to the corporation, you will be taxed with a corresponding amount as income.

The secret of successful expense records is keeping them as you go along and not trying to reconstruct them at the end of the year, or even worse, when the Revenue Agent calls at your office. You then are like the little boy working his arithmetic to match the answers in the back of the book.

Keeping Your Records

The Revenue Service has not provided us with a rule or standard to follow, but experience and cases previously settled indicate certain records that have been accepted.

¶ Keep a daily diary of travel and entertainment expenses. This should show the following information of each outlay: date, place, amount, to whom paid, person involved with their title and firm, and purpose. As a matter of protection under the Sutter rule, you probably should make a notation as to how much you spent on yourself, whether you would have done so otherwise, and if so, what smaller amount you would have spent. This diary, as well as your appointment calendar, also will lend support to the credit card charges paid directly by your firm. It is here that you can easily keep track of the who, what, and why aspects of these disbursements.

¶ Retain a file of all supporting evidence such as hotel receipts, pullman stubs, theater stubs, and similar tabs. Your cancelled checks, monthly charge statements, and other general monthly expense accounts also should be retained. Get in the habit of dictating brief memos for the substantial or unusual expenditures covering therein the circumstances, reasons, and amounts involved.

¶ Keep track of your auto expenses. If you maintain your own car which you use for business purposes, keep track of all your expenses whether they are for gas, oil, greasing, repairs, washings, insurance, or license plates. It recommended that these amounts be entered as incurred in an appropriate record book, in which you also enter the trips taken and mileage. You also should record your opening speedometer reading January 1 and closing on December 31.

Your allowable car expense will be the sum of all these disbursements, plus depreciation on the car, multiplied by the percentage of business use. Remember that travel between house and office is personal not business use.

If you are a corporate employee-stockholder and operate your own car, you should be reimbursed for your car expense. Where reimbursement is a flat rate per mile, you will include this reimbursement on your own tax return, and then in turn deduct the allowable costs.

If you are a corporate employee-stockholder driving a company car, the costs will be paid directly by your firm. Here you will maintain an expense account or diary primarily to show there was little or no personal use made of the car. You should reimburse the firm for any personal use, which includes driving to and from home. Reimbursement is more conclusive than stating you pay part of the cost yourself and then having no evidence of those payments. Any disallowance to your firm for your own use of the car will be taxed to you — so you will be smart to keep complete records.

What Happens When . . .

Assuming you have not been keeping records or that you have been estimating and will continue to estimate, what are your chances to successfully convince a Revenue Agent?

His first objection will be to disallow all unsupported travel and entertainment and also tax you individually on corporate situations. You must at least produce reasonable evidence that you had some expense in order to salvage any of your deduction. Your hope is the Cohan rule, which the courts have been following. Simply put this rule states that something must be allowed if there is proof that something was spent. The Revenue Agent will allow as little as he feels is consistent with the facts, and he has a good chance of being sustained. You will find this a costly substitute for good records. ▲▲

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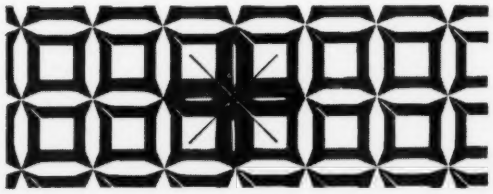
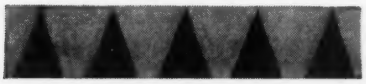


HERE'S A CROSS-SECTION:



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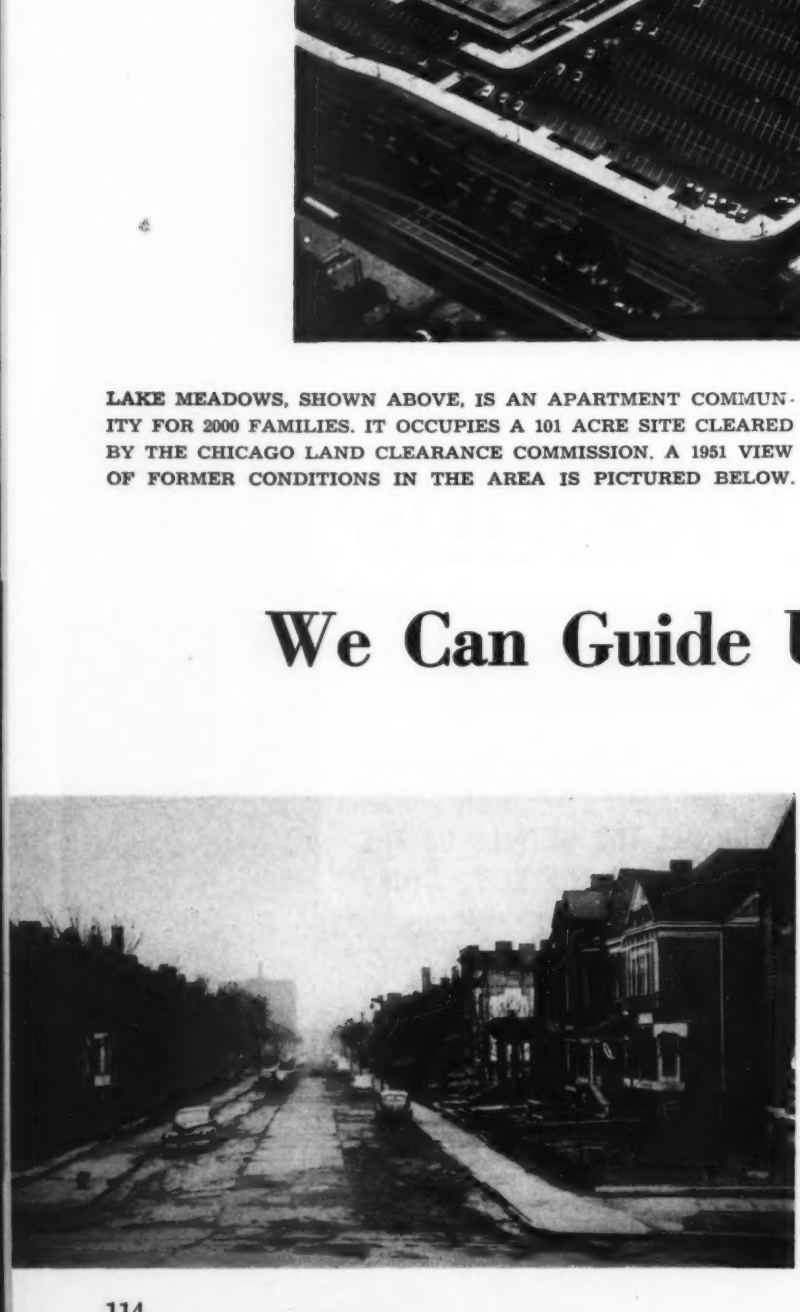
LAKE MEADOWS, SHOWN ABOVE, IS AN APARTMENT COMMUNITY FOR 2000 FAMILIES. IT OCCUPIES A 101 ACRE SITE CLEARED BY THE CHICAGO LAND CLEARANCE COMMISSION. A 1951 VIEW OF FORMER CONDITIONS IN THE AREA IS PICTURED BELOW.

We Can Guide Urban Growth

ARTHUR W. CONSOER, Executive Partner
Consoer, Townsend & Associates



THE U. S. BUREAU OF CENSUS estimates that the total population of the United States is approximately 167 million. This total represents an increase of 35 million since the 1940 census. That is truly a phenomenal population growth, but dependable estimates forecast an increase of 63 million more persons by 1975, which will bring the population of the United States to about 230 million. That represents population growth at a still increasing rate. It seems more than likely that a large part of this increase in population will be located in the fringe areas of important cities and villages in many parts of the United States. There are many well known factors that tend to establish families, especially those headed up by young married people, in the rapidly growing areas contiguous to but removed from the incorporated cities and villages.

Annexation Efforts

In many places strenuous efforts have been made to annex these fringe areas into the incorporated cities and villages, and there is much to be said in favor of annexation programs. On the other hand, there is a very noticeable resistance to annexation in many locations. Originally, such opposition seemed to spring from a desire to find housing at a low cost and to avoid high tax rates prevalent within incorporated cities and villages. Later, tax rates in the fringe areas increase with the development of school facilities and the installation of many municipal improvements, and land values rise, but the resistance to annexation is seldom abated. Local community pride has a way of developing within those fringe areas and it serves to discourage annexation. Often, the result is separate municipal incorporation.

In many parts of the United States the evils inherent in the rather haphazard development of fringe areas call for some aggressive planning on the county or regional level. Of even greater importance is the creation of some type of political or private organization to enforce and make effective the recommendations of county and regional plans. A worthwhile step in this direction was recently taken in DuPage County, Illinois. This county lies immediately west of heavily populated Western Cook County, in which Chicago is located. The rapid recent — and predicted future — population growth of DuPage County are shown on the chart.

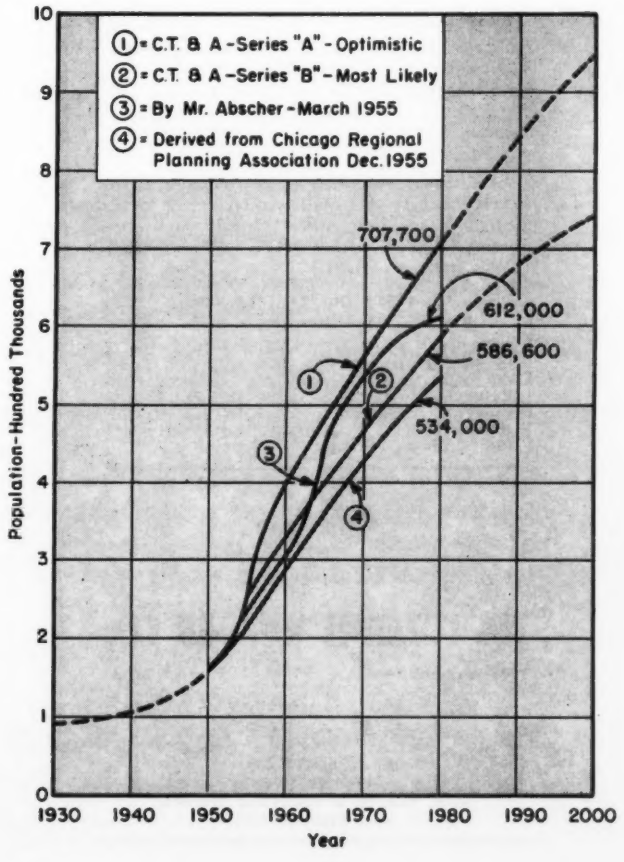
A recently completed DuPage County Plan Report, prepared by our firm, covers not only permissible land uses, with an accompanying proposed new arterial highway plan and zoning ordinance for all unincorporated areas in the county, but it also gives rather detailed attention to major drainage problems, sanitation problems, and water supply programs. To implement the County Plan there has been proposed the formation of a county-wide river conservancy district which, under Illinois law, has broad powers and can be very useful in expediting worthwhile projects recommended in the report.

In many parts of the United States there is vigorous discussion and differences of opinion with respect to water supply. Is it better to create metropolitan waters authorities or should the expansion of established municipal water supply systems into fringe areas be encouraged? Municipal systems require financing measures and the establishment of connection charges and rate schedules somewhat in excess of those prevailing within the incorporated areas. At Joliet, Illinois, the expansion of a city water and sewer system outside the corporate limits was effected with good results by use of water and sewer revenue bonds.

Where the metropolitan water authority scheme is used, annexation usually is hindered. Where the municipal water system is expanded, annexation often is expedited because it would be accompanied by a reduction in water rates for the fringe areas.

In many instances the shift of population to the fringe areas can be erased or minimized by intensive development of vacant land within the corporate limits of a municipality. Urban redevelopment work is proceeding now in many American municipalities and deserves broader and more intensive application.

The federal government and many of the states have passed enabling legislation for urban redevelopment projects, including site development and housing. In Illinois, for example, both federal and



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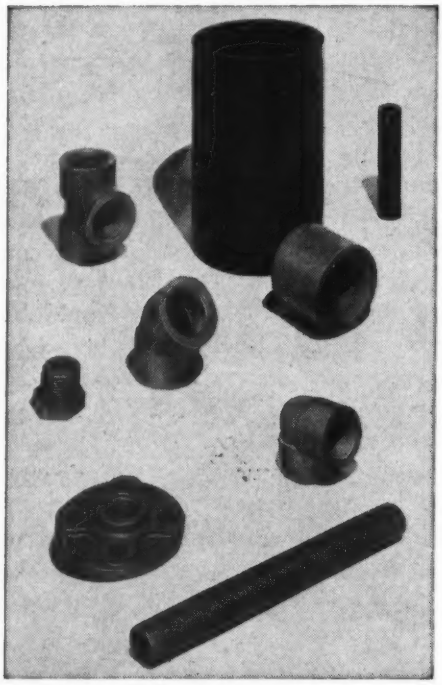

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state grants-in-aid are available for land acquisition, for planning, and for the construction of improvements. In general, the construction by the redevelopment authority is limited to public improvements, with the residential and commercial structures financed by private capital.

Rezoning of land presently zoned for industrial and commercial use also can be utilized where advisable to increase urban areas available for residential development. This is particularly true in instances where excessive amounts of industrial and commercial zones have previously been set up.

Along with redevelopment plans and rezoning operations can go changes in building codes calculated to promote the use of vacant land in urban areas. Improved highway parking and transit facilities are effective in many urban areas in enhancing population growth. The New York Life Insurance Company's Lake Meadows project, just south of the Loop in Chicago, is a good example of how more people can be settled in urban areas by demolishing slums and building well designed, comfortable, healthful, multitype family units. There is frequently very little need for readjustment of underground, surface, and overhead utilities on redevelopment projects or when idle land is utilized for building purposes.

Land Now Wasted

With the considerable increase in land value that is taking place in most urban areas, vacant land which has been burdened with unpaid general taxes and special assessments can be cleared of such incumbences and put on the market for building sites in a profitable manner. Re-establishment of idle vacant land calls, however, for vigorous leadership on the part of public officials and private interests. In the suburbs of Chicago there are countless instances of profitable use of vacant lots which have been producing nothing but weeds for 20 to 100 years. How much better it is to use that type of building lot for new modern homes and apartment buildings than to permit the people who could and would occupy those residential buildings to drift to the fringe areas beyond the corporate limits of incorporated cities and villages.

Shopping centers, too, can be profitable and efficiently located in urban areas as well as out in fringe areas. Examples of successful locations are Lincoln Village Shopping Center at the intersection of Lincoln Avenue and McCormick Road, in Chicago, and the even larger shopping center constructed as a part of the Lake Meadows redevelopment project.

There are, no doubt, many other ideas that can be used to encourage urban living and discourage the movement of the population to the fringe areas. Consultants can do much to improve the economics and living conditions in countless cities, large and small, but we must get to work before these cities are all stores, slums, and crowded streets. ▲▲

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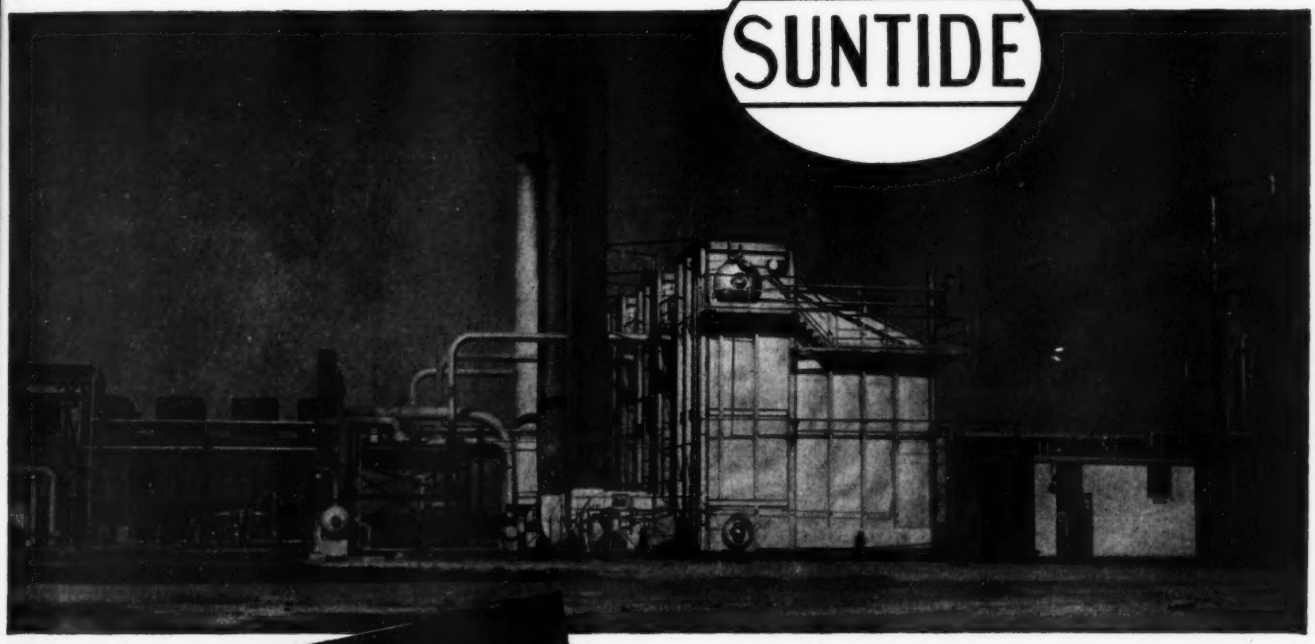

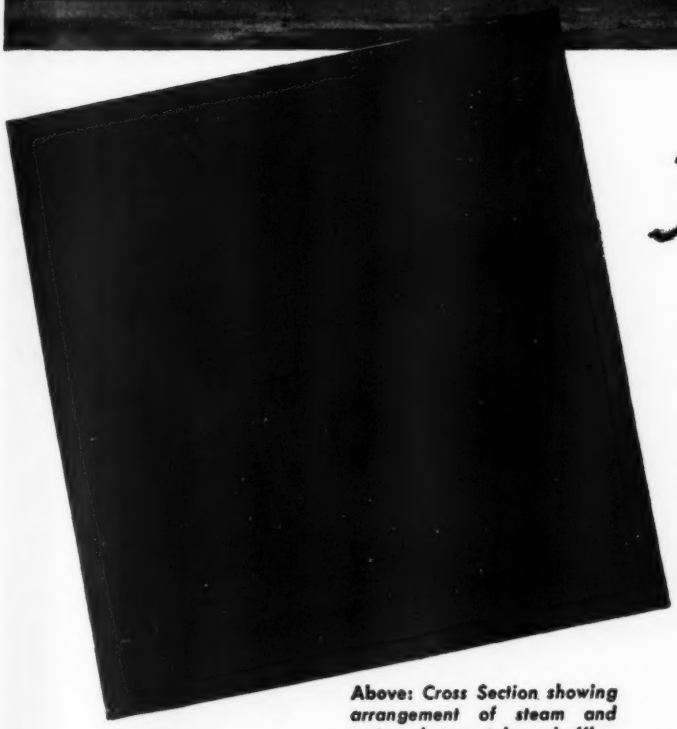

Above: *Cross Section showing arrangement of steam and water drums, tubes, baffles, and furnace.*

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Report From England

F. C. LIVINGSTONE
CONSULTING ENGINEER CORRESPONDENT

ONCE MORE the English Channel tunnel project — an almost dormant dream for more than a quarter of a century — is being discussed by European statesmen and industrialists. In the corridors of the British Houses of Parliament and the French Chamber of Deputies, the tunnel is causing more verbal stir than at any time since 1930, when the proposal was defeated in Commons by only seven votes.

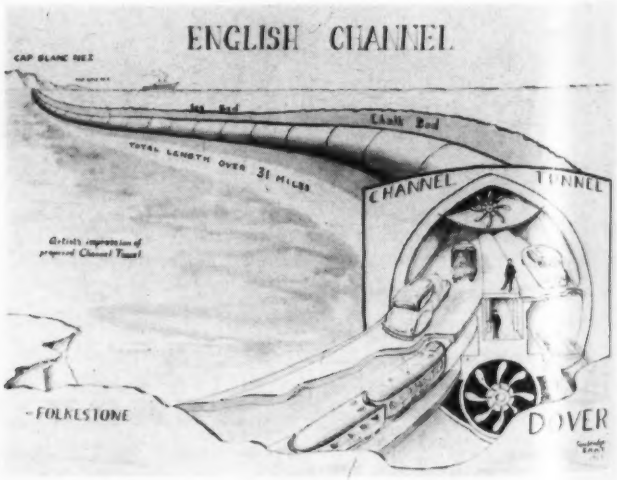
The proposed European Free Trade Area, which would link Britain economically to Europe, has sparked the realization that Britain can only compete on equal terms if she can deliver her products as quickly, cheaply, and safely as the countries with only land frontiers to cross.

The Society of Motor Manufacturers and Traders, whose member firms will be in the forefront of the tussle for markets as the ties between the countries of Western Europe become closer, is spearheading the demand for the tunnel. From their point of view and that of a quickly growing number of businessmen and MP's, this means that the tunnel must be started at once.

Currently several major financial groups in Paris and New York have indicated that they are highly interested in the tunnel scheme, and preliminary planning already has begun. In London, one of Britain's most eminent firms of consulting engineers is drawing up reports estimating possible costs and construction methods.

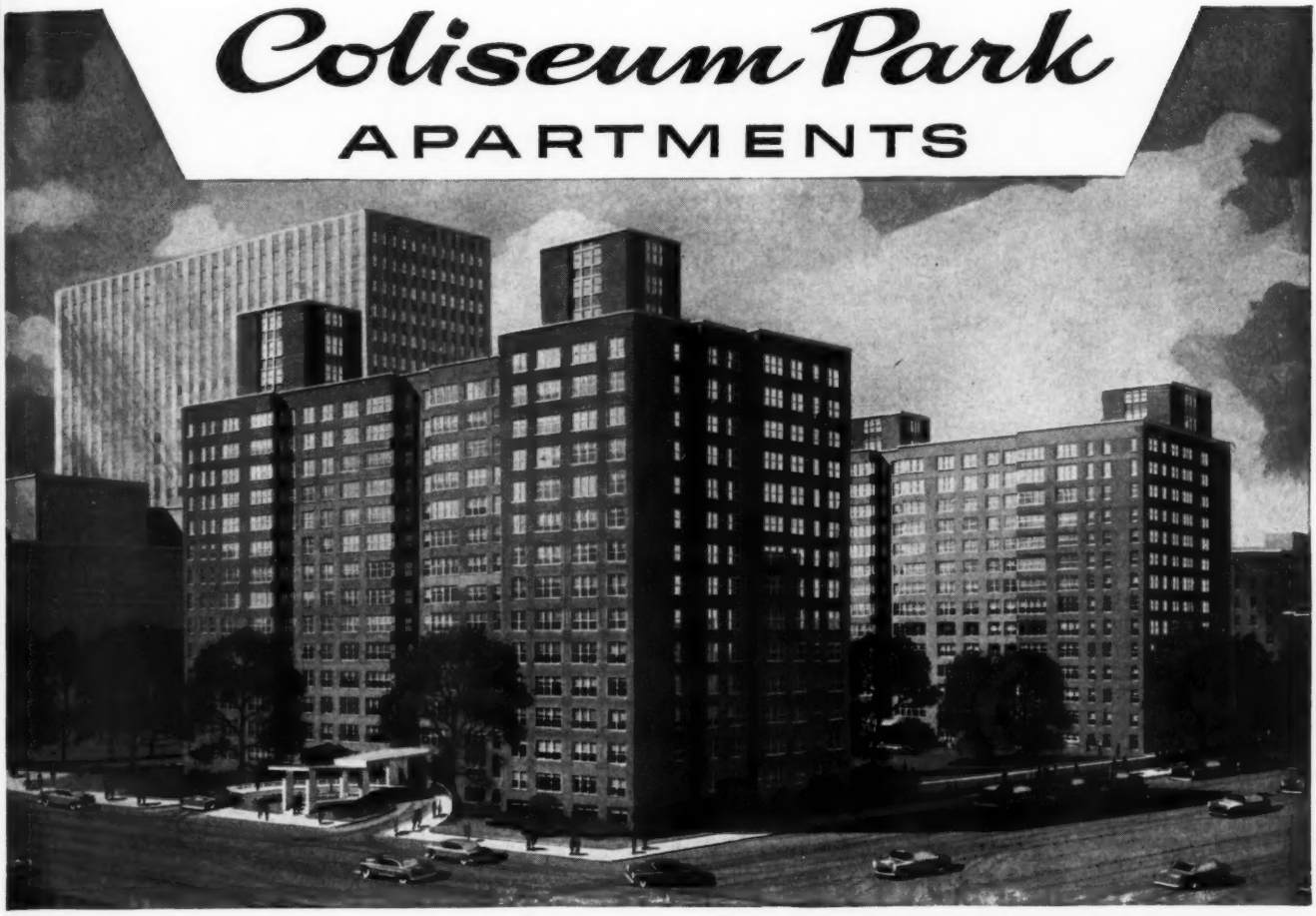
The all-party Channel Tunnel Parliamentary Committee is being quickly reconstituted, and sev-

LAST CHANNEL TUNNEL ATTEMPT WAS MADE IN 1880.



ARTIST CONCEPT OF NEW ENGLISH CHANNEL TUNNEL.

Coliseum Park
APARTMENTS



The new Coliseum Park Apartments in New York City are completely air conditioned with 1350 Chrysler's Airtemp Imperial "All-in-wall" units.

Owners-Builders:
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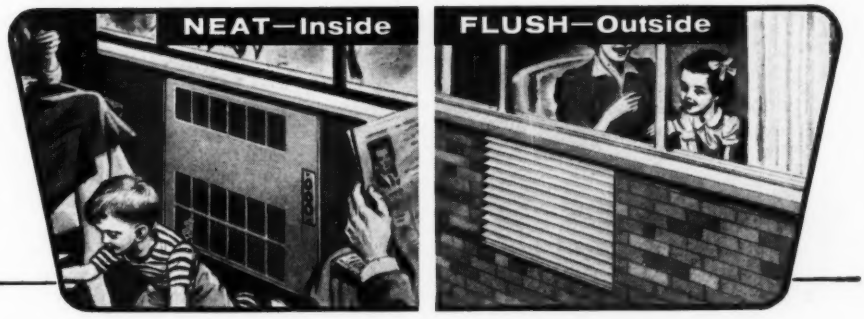
Architects:
Silvan and Robert Bien.

AIRTEMP IMPERIAL "ALL-IN-WALL"



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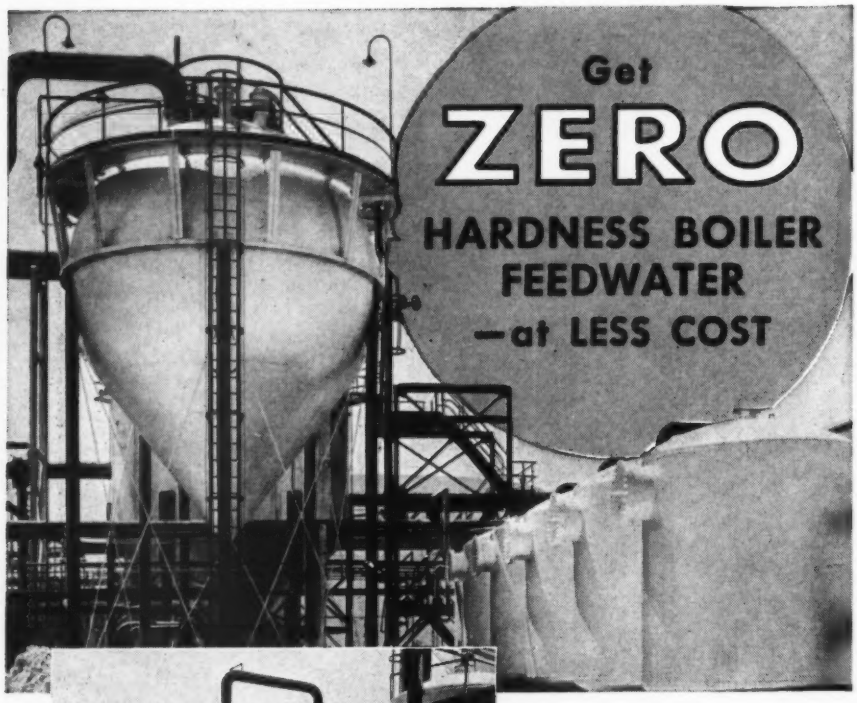

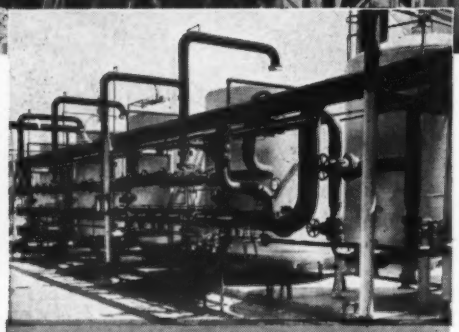

Top photo shows new outdoor hot lime-zeolite softener installation in a Southern refinery. Five Nalcite HCR ion exchange units (lower photo) have output of 470,000 gallons of zero hardness water between regenerations.

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eral fresh recruits have joined. In the city, prices of Channel Tunnel Company shares rose in a week from under 25¢ to $1.70.

At the same time, it became known in Paris that authoritative French opinion favored immediate action. Among the main French friends of the tunnel are the Prime Minister, M. Guy Mollet; M. Christian Pineau, the Foreign Minister; M. Joseph Laniel, a former Prime Minister; and General Corniglion Molinier, a former Minister of Transport and Public Works.

Three Schemes

What form will the tunnel take, and what will it cost if and when the government agrees to action? Present plans are that it would follow the original line of 1880, driving from a point near Folkestone, through the chalk bed about 270 feet below the water to Sangatte, near Cap Blanc Nez, in France. The total length, including a run-in of about 3½ miles on each side of the water, would be 31 miles.

The three main schemes now being considered are:

¶ A freight and passenger carrying railroad with cars joined by hinges to make one continuous train. About 100 cars could be carried at about 60 miles an hour.

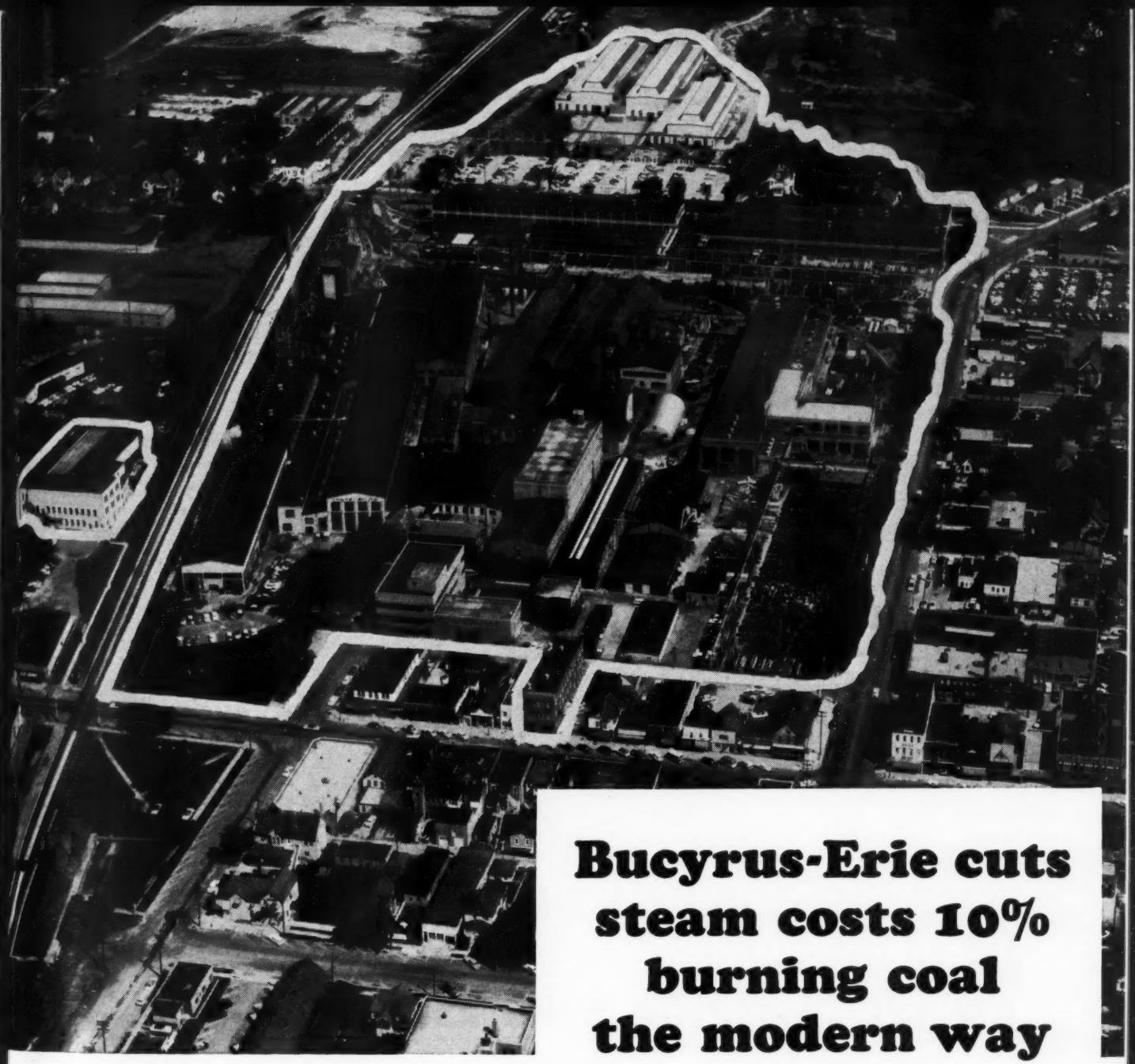
¶ A two-way road and rail system, such as has been planned by Mr. Andre Basedvant, architect, engineer, and technical secretary to the French Tunnel Committee.

¶ A moving belt to carry both vehicles and freight.

Cost Estimates

Estimated costs vary from about $250 million for a double track rail tunnel to more than twice that figure for a combined road and rail system. With France sharing the expense of a double track tunnel, the cost to Britain over the nine years estimated building time would work out to only $14 million a year.

But the plans of the tunnelers do not stop at Folkestone and Cap



Bucyrus-Erie cuts steam costs 10% burning coal the modern way

Note to consulting engineers:

Many companies planning a new power plant, or the remodeling of a present one, consult an engineering firm on its design and construction. When you have such a project, our Engineering Department will be glad to assist you in your fuel cost survey with any coal information you may require. In most cases, for the reasons listed below, the use of coal results in substantial savings in increased efficiency and fuel economy through the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available. • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar. • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use. • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

Bucyrus-Erie Company, South Milwaukee, Wis., had a steam generation problem. Not only was original equipment deteriorating but capacity proved inadequate for expanding plant facilities. Working with consultants Gates, Weiss and Kramer, of Milwaukee, the company decided to modernize its power system.

Today the power plant at Bucyrus-Erie is almost completely automatic and utilizes the newest coal-burning and handling equipment. In addition to increasing steam generating capacity 85%, this modernization program has lowered annual steam production costs 10% and labor costs 35%. Burning coal the modern way has increased steam quality, improving production processes and heating throughout the plant.

For additional case histories on burning coal the modern way or for technical advisory service, write to the address below.

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Blanc Nez. Many industrialists visualize a full network of motor roads from all over Britain leading to the tunnel — the linking of the London subway network at one end and of the Paris Metro at the other.

The tunnel advocates claim that the isolationists no longer have a case. Indeed, in 1955, Prime Minister Macmillan, then Minister of Defense, yielded a point tenaciously held by the military and many politicians since Napoleon first suggested a tunnel in 1802. Asked if any strategic military objections remained, Mr. Macmillan replied, "Scarcely any."

Militarily Unimportant

It has been accepted that in an H-bomb and rocket war, no enemy would try to invade by tunnel. Even so, there would be a man standing by to open a valve and admit a quantity of water at the point in mid-channel where the tunnel would dip. The tunnel would be sealed for 100 yards. In an all-out war, who would care.

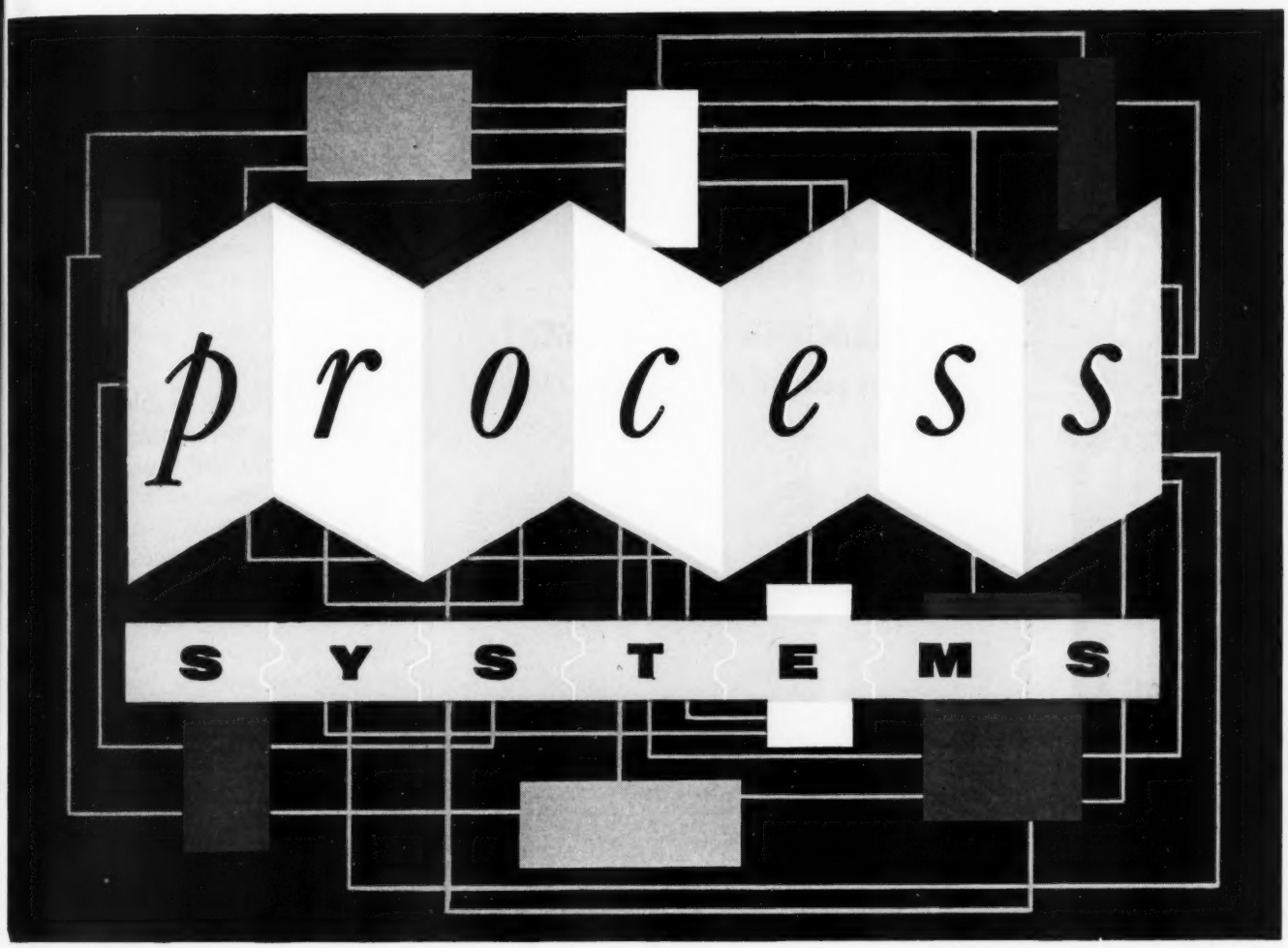
The Channel Tunnel Parliamentary Committee argue that even in 1930 the tunnel was regarded as a sound engineering project; earlier, men such as Stephenson and Brunel, pioneers of railroads in the 1820's were enthusiastic. Today, with vastly improved engineering techniques and equipment, the tunnel is more than ever a practical plan.

Economically Sound

The view that it would cost too much and would not bring in enough revenue to cover capital investment was put forward by the Parliamentary Secretary to the Ministry of Transport in 1955. To this Commander Christopher Powell, secretary of the Channel Tunnel Study Group, replies:

"Our Parliamentary Committee estimated there would have been annual receipts of $10 million a year giving a profit of $3.7 million had the Channel Tunnel Company's 1949 report been accepted.

"Today a fairly high toll charge



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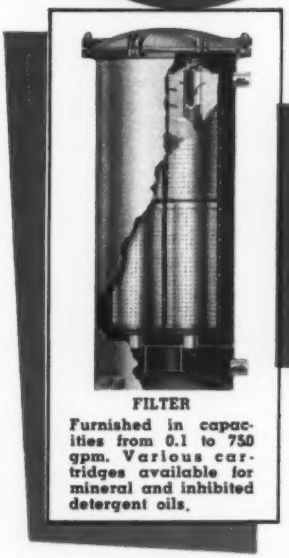

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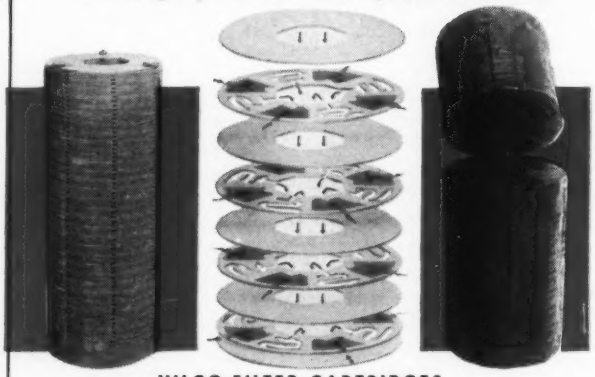

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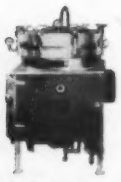

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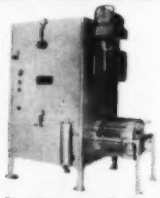
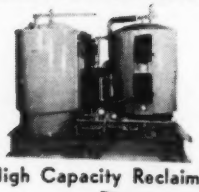


Purifier Re-Refiner



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would be considered worth paying by the 125,000 motorists who go abroad for their holidays, if they could take their cars to the continent at any time without having to book six months ahead. The tunnel would give great encouragement to Europeans to visit Britain."

Ventilation

One of the few problems admitted by the pro-tunnelers is ventilation, should the tunnel be used by automobile traffic. But this again, they believe, could be overcome. A French suggestion is that ozone could be pumped in to counteract carbon monoxide. The study group points to the recent French decision to build a road tunnel under Mont Blanc.

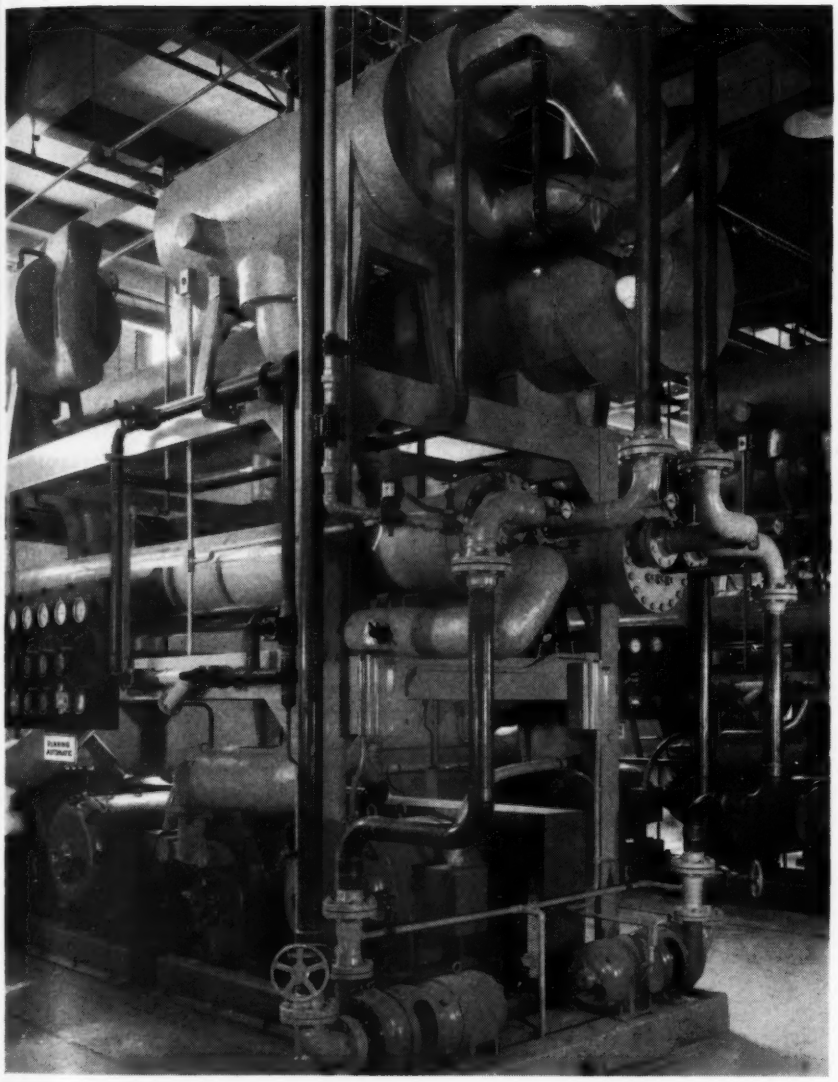
Earlier Tunnel

On the English coast, at Abbots Cliff near Folkestone, what is left of the first and last working attempt at joining Britain and France under the sea lies forlornly concealed behind a battered door. This pilot tunnel, known simply as Heading Number 20, originally stretched for 2½ miles parallel with the water to a shaft at Shakespeare Cliff, Dover, where it turned for a mile out to sea. Twenty miles across the Channel at Sangatte similar French workings still exist.

Now all that remains at Folkestone is a few hundred yards of the pilot tunnel. The chalk walls and the roof are still in fairly good condition although a thin film of mud covers the floor, and water has broken through in several places.

On one wall there is still the somewhat pathetic inscription in the spelling of a workman of 77 years ago, "This tunnel was begubugn in 1880. William Sharp."

Why William Sharp lost his job and the tunnel was suddenly abandoned never has been properly explained. Suddenly and for no clear reason there was violent agitation against the Government, who were accused of deliberately



AUTOMATICALLY CONTROLLED supply of —40°F ammonia for process use is produced in ammonia reflux system (left). Two duplex 150 hp Worthington reciprocating compressors are used for low temperature brine system (right). All heat exchange equipment was supplied by Patterson-Kelley.

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One of the largest automatic cascade refrigeration systems ever built is now operating full-time at the Hoffmann-LaRoche plant in Nutley, New Jersey. This system with 2000-H.P. capacity provides —40°F ammonia and 10°F brine for special process work. Exchangers contain 73,590 feet of tubing. Photo shows one of 4 duplex brine units (4 duplex and 1 single low temperature unit not shown).

In addition, the system offers a unique answer to one of the most complex problems in the refrigeration industry: to provide, automatically, a continuous supply of accurately controlled low temperature ammonia. This was made possible by the use of P-K balance loaders and slug eliminators.

The system, designed by Mr. J. W. Obreiter, Jr., consulting engineer of Hoffmann-LaRoche, is made up of an ammonia reflux system and a low temperature brine system.

Next time your system demands efficient, trouble-free heat transfer performance, it will pay you to call in Patterson-Kelley. For details on the exact equipment to fit your needs, write the Patterson-Kelley Co., Inc., 129 Burson St., East Stroudsburg, Pa.

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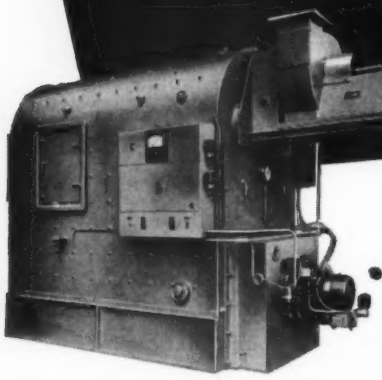

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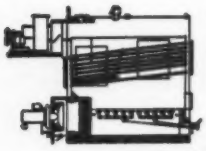

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tampering with the country's safety.

Lord Wolseley denounced the tunnel as a "French Plot." The Dukes of Wellington and Marlborough, Robert Browning, the poet, and generals and admirals by the score petitioned the Government. Parliamentary permission to continue tunneling was abruptly withdrawn.

Seventy eight years of planning, negotiation, compromise, and faith had come to nothing. Queen Victoria was presumably not amused at the abandonment of the work for she had earlier remarked to Napoleon III, "You may tell the French engineer that if he can accomplish it, I will give him my blessing in my own name, and in the name of the ladies of England."

Since the first tunnel plan was drawn up by one of Napoleon's military engineers, a M. Mathieu, it has fifteen times seemed within reach of success and fifteen times has been defeated.

Long History

The list of its champions includes; Napoleon, Queen Victoria, Sir Winston Churchill, Marshal Foch (who claimed that the 1914-18 war would have been over in half the time had the tunnel been in existence), Albert the Prince Consort, and Charles James Fox. Mr. Gladstone whole-heartedly approved the idea and consumed a trolley-borne champagne luncheon in the 1880 tunnel workings.

Among those in opposition were Joseph Chamberlain, Lord Kitchener, Mr. Balfour, Mr. Asquith, Lord Randolph Churchill, and the Duke of Cambridge.

Shortly, the shareholders of the Channel Tunnel Company will gather in a fifth floor room in London's Finsbury Circus for the 76th annual general meeting. Then, the 530 men and women who hold the 456-thousand $0.56 shares in the company will be able to feel, for the first time in years, that maybe there is a green light at the end of the tunnel. ▲▲

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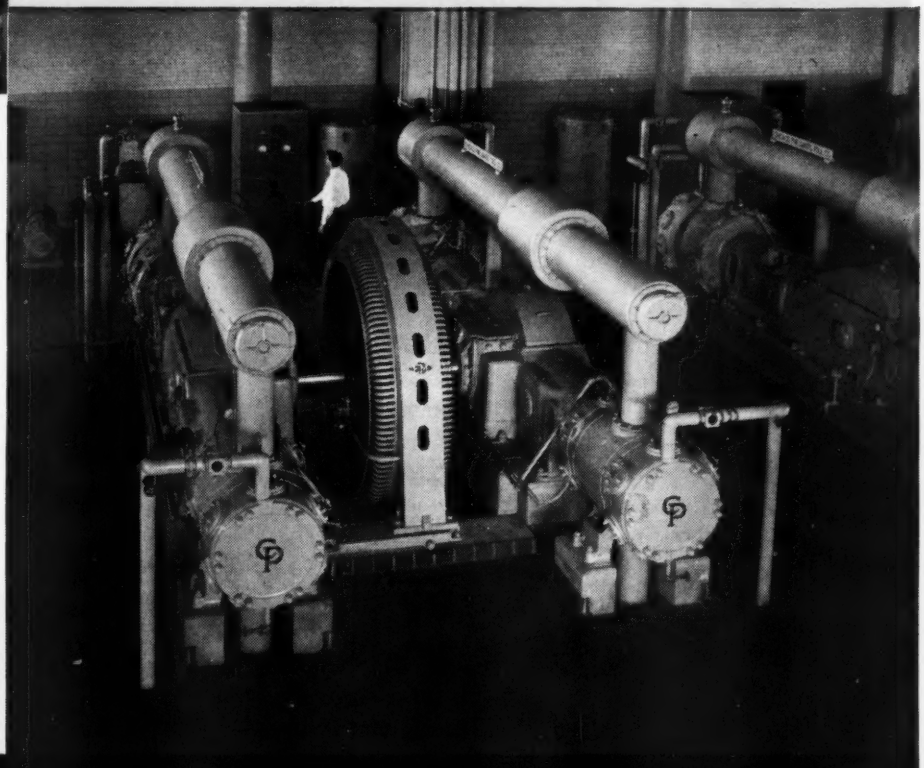

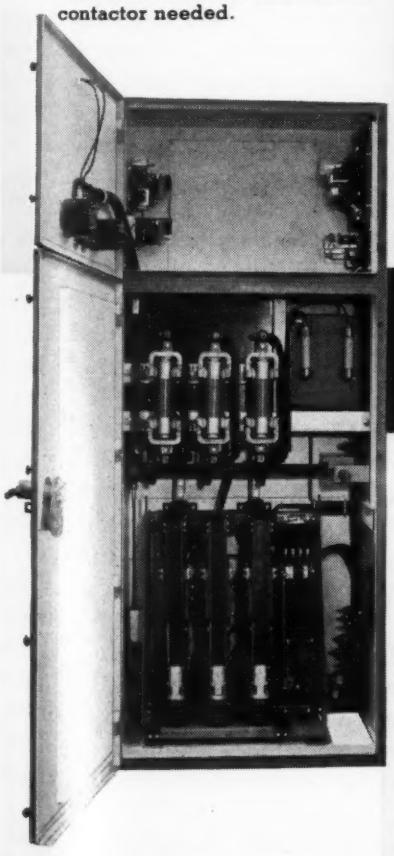

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Report From The East Coast

STAFF

Any consulting engineer working outside of New York City, who signs a Public Housing Authority form contract, is running a risk of not being covered by his errors and omissions insurance.

Early last year, six New York public housing projects using the PHA form contract were awarded to architects, who then engaged consultants. The consultants, reading carefully through the contract, noticed two rather questionable clauses. Basis for most concern was a clause which stated, "the architect (and consequently the consulting engineer) shall apply to the preparation of the plans and specifications the reasonable and proper skills, judgment, and care which are customary and normal to professional architectural practice, and shall indemnify the Local Authority for any damages, loss, or liability imposed upon the Local Authority as a result of any negligence or failure by the architect in such respects."

The consultants began work on the projects, but filed vigorous protests with the New York Public Housing Authority. City officials explained that the contract they were using was a form contract, prepared by the PHA in April, 1955. Any changes would have to be approved in Washington, William Eipel, of the New York Association and the Council fees and contracts committees, was told.

The engineers continued on the public housing, working without contracts. Letters were written to Washington to find out exactly how the clause had originated.

Charles E. Slusser, PHA Commissioner, explained, "It may be of interest to you to know that the AIA, through their consultant on contract documents, has granted that the section in question 'is a fair and well-balanced statement' and the AIA has indicated in one of its publications . . . that it recognizes the validity of our position. It is quite true that a number of architects have objected to the inclusion of this section . . . , not that it goes beyond normal legal requirements but because of their concern that it may be improperly used to their disadvantage.

"In any event," Slusser continued, "you must, upon thought, realize that to delete this section, which is now in force in a great many contracts, would be to indicate our lack of intent to exert proper legal rights in the Federal interest."

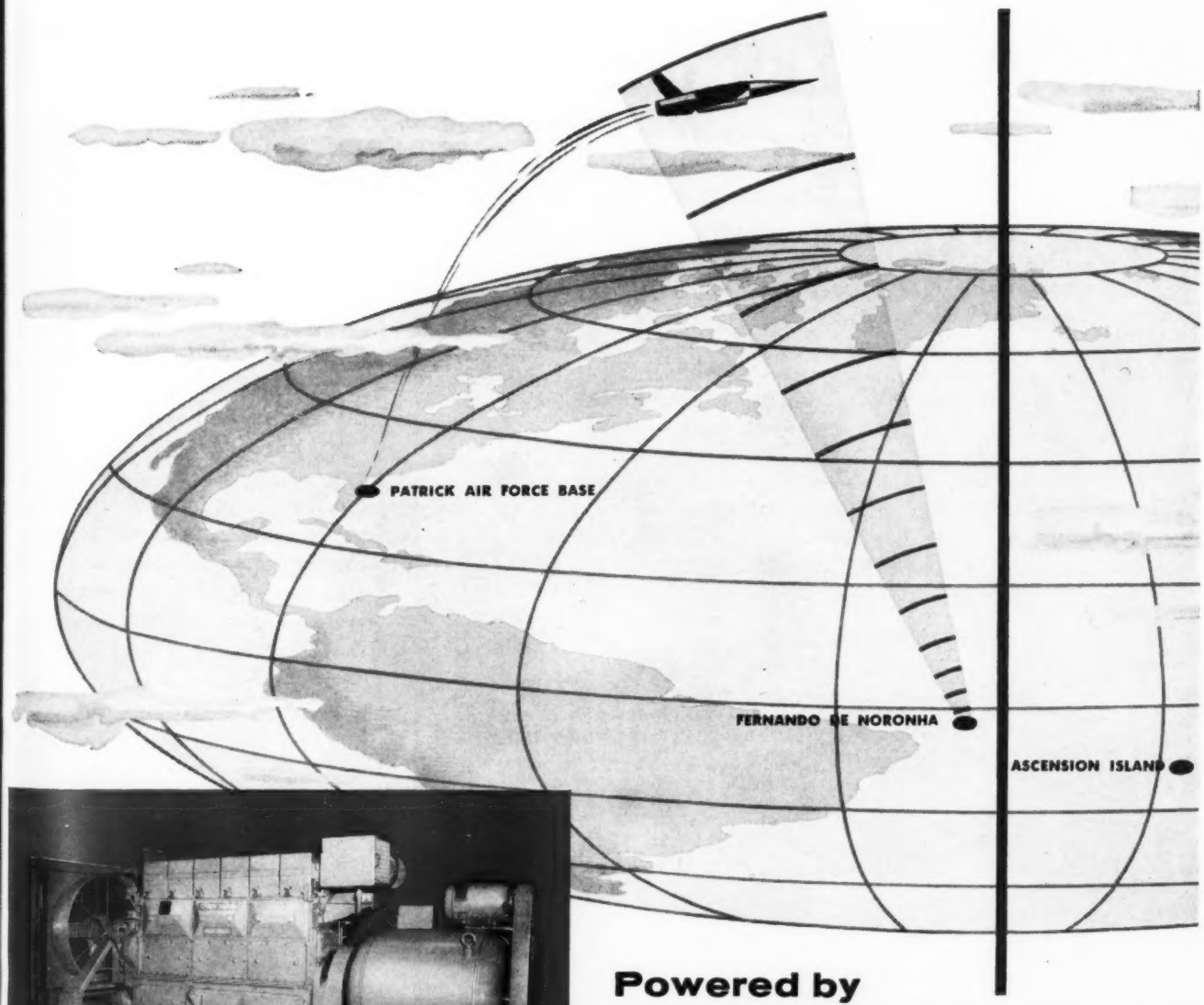
Attached was the AIA newsletter, dated Aug. 15, 1955. Sure enough, the newsletter announced that "we are pleased to report to our membership that PHA has no intention of attaching responsibility for extras on the architect unless he is believed palpably guilty of professional negligence or incompetence." The report explained that at a meeting with N. J. Schlossman, of the Institute's committee on architect and government, and AIA Executive Director E. R. Purves, the two were assured that architects should undertake public housing jobs with complete confidence and the "knowledge they will receive fair and equitable treatment."

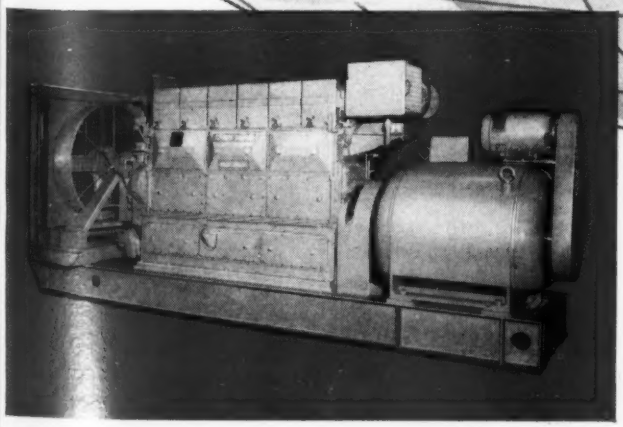
However, all of the architects were not so sure of future legal interpretations of the clause.

New York AIA members wrote to see just who had approved the clause on behalf of the AIA when the contract was being written. They were told that "the Institute never gave official approval of these clauses. Its Consultant on Contract Procedure did, however, make his personal opinion available to the PHA, which was to the effect that the clause was proper."

Meanwhile, the New York Association of Consulting Engineers and AIA representatives began a concerted effort to get the form contracts changed.

On behalf of the New York Association of Consulting Engineers, John K. M. Pryke, president, wrote a letter of protest to the AIA pointing out that the contract, in effect, demands that architects and engineers be 100 percent perfect or be penalized. He





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pointed out that it is impossible to define the limits to which the contract applies.

Spokesmen for Lloyds of London, which carries the errors and omissions insurance for the New York Association of Consulting Engineers, were even more outspoken in their opinion of the contract. The insurance men explained that the contract imposes upon the architect and engineer obligations which extend beyond the errors and omissions coverage. "Such damages, in our opinion, might include claims against the Authority for loss of business, trespass, interference with gas and electric facilities normally available to adjoining property owners, and other types of consequential damages."

At that time the insurance firm refused to insure any project engineer for a project on which he had signed such a contract.

Recently, however, the insurance company has reopened discussions on the possibilities of charging extra fees and insuring for PHA engineering. No decision has been announced.

The New York groups succeeded in getting the clause slightly modified for projects handled by the New York City Housing Authority. However, attorneys still advise engineers handling New York PHA contracts that the corrected clause leaves much to be desired.

One primary accomplishment of the amendment was to eliminate the words "indemnify" and "any" (the latter preceding "damages"). Third party liability possibilities also were lessened with elimination of "liability imposed upon the Local Authority" from the clause. New York consultants still would like an additional amendment defining the responsibilities of the architect and the engineer.

Another clause, in the "model" PHA contract states that the architect is required to revise the plans at his own expense (barring a few special conditions) if bids exceed the budget. Engineers

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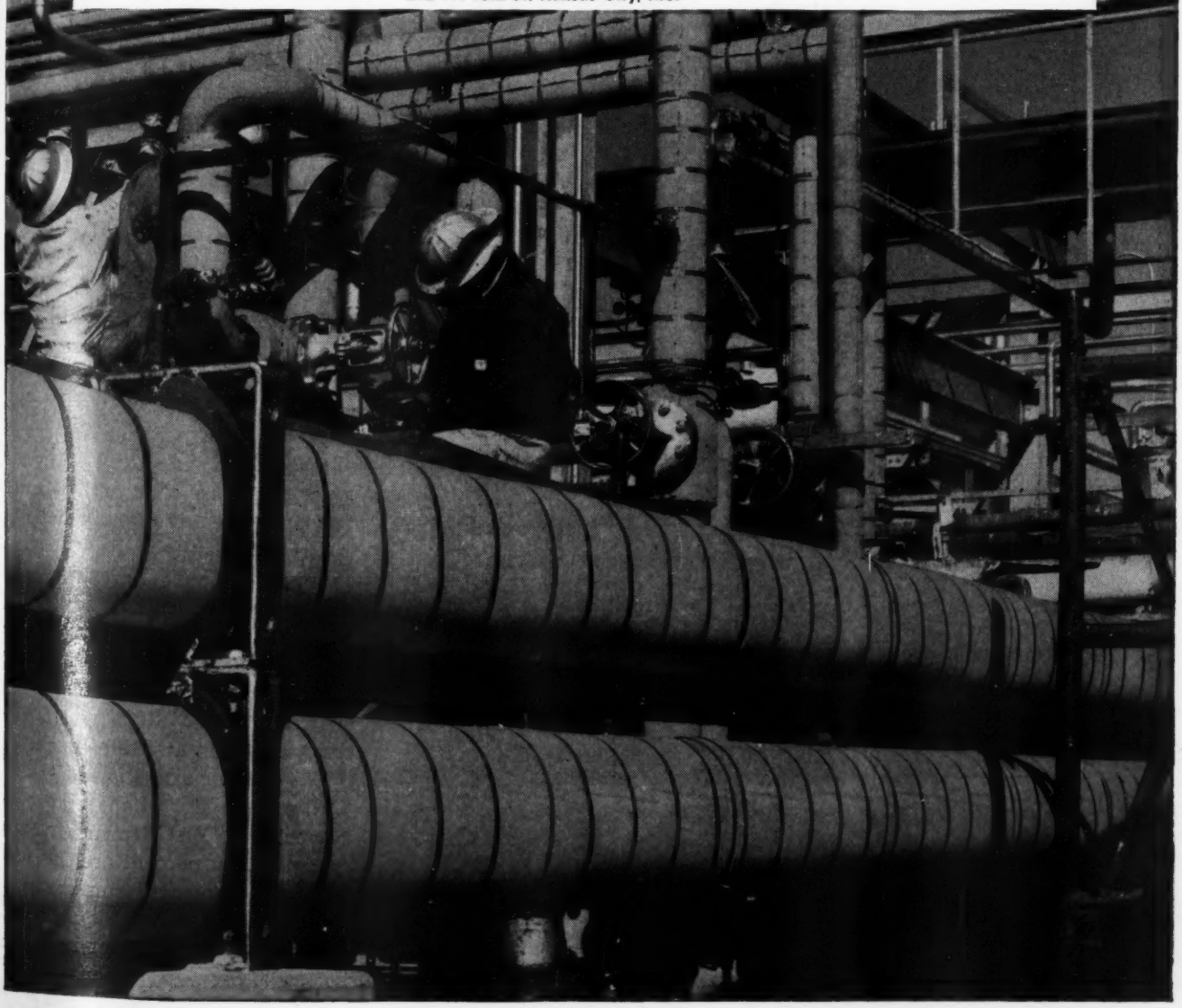

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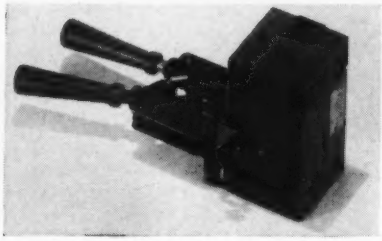

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and architects alike are unhappy over being held responsible for guessing what the bids might be.

Many letters, from architects and consulting engineers, have been sent to the Public Housing Authority offices in Washington objecting to their present form contract. Washington offices of the AIA are working to get the contract changed.

Latest word from Washington on the situation? A number of sizeable lawsuits, based on the PHA contract, are pending against engineers and architects. And the PHA has shown no inclination to change the controversial contract.

Salary Survey

In its salary survey this year, the NYACE has included employee fringe benefits for the first time.

The survey showed that in firms with Blue Cross, an average of only five percent of policy cost is paid by the employer. In organizations with life insurance for employees, the firms usually pay 90 percent of the costs.

An average employee is given two weeks termination notice, and is paid for an additional two weeks, if he is discharged. The employee also is required to give two weeks notice if he is quitting, and he is given no quitting pay.

In consulting firms, the average employee also gets two weeks paid vacation, nine paid holidays, and 10 days paid sick leave. Anyone working more than a 40-hour week receives time and a half.

The survey also showed that salaries in the N.Y. area are continuing their uphill trend for all grades of engineering employees.

In 1948, when the first survey was taken, a junior draftsman assistant received $43 a week. Today, he starts at $70 a week.

The survey also showed that:

¶ Thirty percent of the contracts signed by NYACE members are cost plus; 70 percent are flat fee.

¶ NYACE contract forms are used by 31 percent of those queried.

Most surprising bit of information was that 35 percent of the

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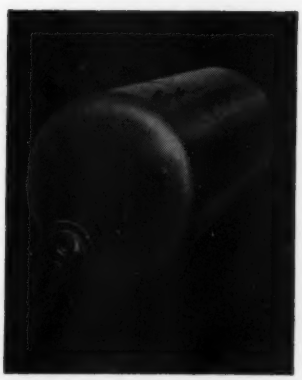

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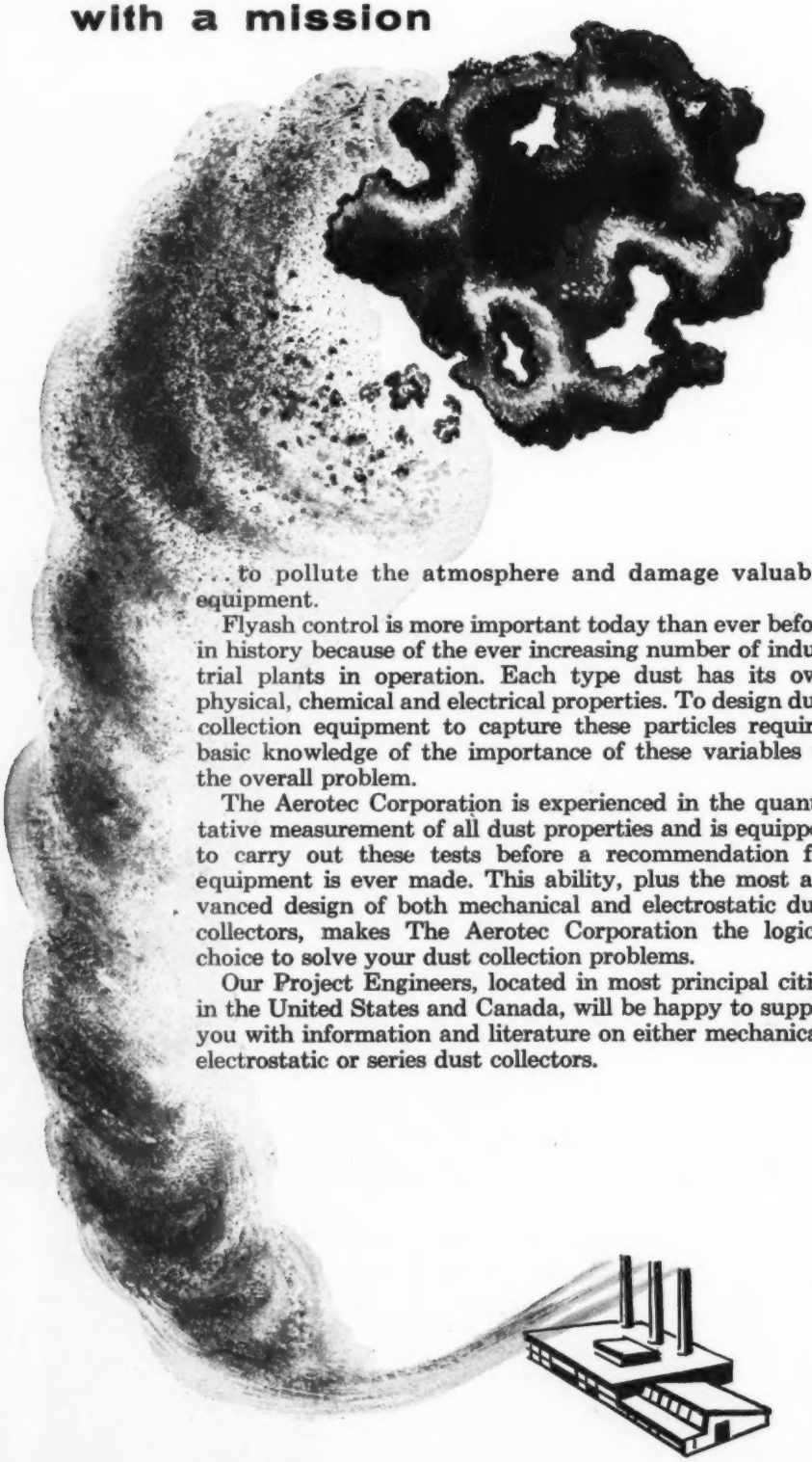

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New York Association members have contributed to the cost of correcting engineers errors and omissions during construction. Only a few firms ever have collected on the two-year-old errors and omissions insurance, however, indicating that the 35 percent have been in error only in minor instances. No time limit was set on the question, so the instances mentioned could date back for many years.

ASCE Survey

The American Society of Civil Engineers also has completed its fourth biennial salary survey, which showed a marked increase in engineering salaries. As in previous years, the greatest percent increases were recorded in the lower professional grades. Unlike previous years, however, the percent increases remain relatively high up through Grade III (all positions which involve, under general supervision, the performance of civil engineering duties of substantial difficulty and responsibility). The increases in salaries of employees of the consulting engineers were shown to be generally parallel to the listed national averages.

Group Medical Policy

After several years of preparations, the New York Association of Consulting Engineers hopes to be able to present an acceptable group medical-life insurance program for their employees at the September luncheon meeting.

For the past month, Sigmund Roos, chairman of the committee appointed to select an insurance program which Association members could offer to their employees, has been querying the Association members with the largest number of employees and has been investigating every possible insurance policy.

At the July meeting, Roos and his committee presented a tentative plan which the members did not accept. Primary objections to the program, which would have

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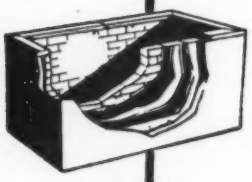

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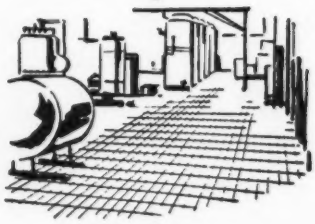

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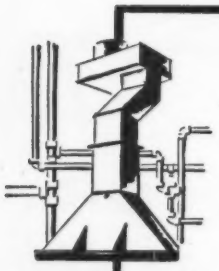

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protection of all corrodible surfaces is possible by using the proper Atlas coating . . . vessel exteriors, walls, beams, ceilings can be coated for lasting service.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

ATLAS PRODUCES THE MOST COMPLETE LINE OF CORROSION PROOF MATERIALS OF CONSTRUCTION AVAILABLE FROM ONE MANUFACTURER

cost $100 per man per year, was that maternity benefits were not provided and that anyone taking the suggested policy could not carry Blue Cross-Blue Shield in addition to the Association policy. Roos went back to the company which had drawn up the original policy. The same firm — Massachusetts Mutual — started over. This time they are offering a plan which allows employees to also carry Blue Cross-Blue Shield, but the new plan carries a compulsory life insurance feature.

At the July luncheon meeting, there were almost as many suggestions for revising the policy as there were members present. Roos said that he now realizes he cannot find a policy that will satisfy everyone. He now is trying to work out a policy to please the persons having the largest number of employees. "We're going to know the plan is acceptable to the large firms before we present it this time," Roos added. "And we hope that a large number of the engineers who have only a few employees also will take out the group insurance."

Roos said that he will stress that Association members are getting a policy that is custom-made to cover the aspects they consider most important. Although preliminary proposals do not cover loss of limbs, Roos said that gradually the insurance plan can be expanded. He also is hopeful that the plan will be accepted widely enough so that premiums can be lowered in the future.

Working on the committee with Roos were Emery Markush, Irving Quinn, and Peter Stark.

Several years ago, Association members asked that a study be made to find a medical policy which they could obtain as a group. At the time, the consultants said industry — with their higher wages and fringe benefits — were luring away many of the consultants' employees. Members decided the only way to fight fringe benefits was with fringe benefits. ▲▲

MOTORS are "double protected"

New Integrated Field Coils Plus *Silco-Flex* Stator Insulation Provide Superior Motor Protection... Under Any Operating Conditions

1

Integrated Field Coils are bonded in heat-stabilized resins, enclosed in a resin-impregnated sheath of oriented glass fibers and bond-locked on the pole structure . . . dimensionally stable to withstand heating and thermal shock, vibration and fatigue at elevated temperatures . . . sealed throughout against atmospheric contaminants and fully protected against destructive forces.

2

***Silco-Flex* Insulation** provides a homogeneous, void-free insulating wall of silicone rubber on stator coils. It is unexcelled in life and thermal stability at high temperatures . . . resistant to most chemicals, water, weather . . . outstanding in flexibility and resilience . . . able to withstand abrasion and corona . . . resistant to physical and mechanical forces.

Exclusive Allis-Chalmers "double protection" is available on large electrical machines with operating temperatures through Class B range.

Silco-Flex is an Allis-Chalmers trademark.

For more information on these quality insulation systems contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin for Integrated Field Coil Bulletin 05R8525 and *Silco-Flex* Insulation Bulletin 05R8341.

Allis-Chalmers "Double Protection," with integrated field coils and *Silco-Flex* stator coil insulation, adapts this 600-hp, 2300-volt, 600-rpm synchronous motor to the most severe operating conditions.

CHALMERS

A-C ALLIS-CHALMERS

A-5221

Beyond Our Borders

Money for Railroad Improvement

India has received a loan equivalent to $90 million from the World Bank to finance part of the cost of importing, during 1957 and 1958, equipment to modernize and develop the Indian railroad system. The money will be used to purchase locomotives, rolling stock, and equipment for the $2363 million Railway Improvement Program, which is part of the Indian Second Five-Year Plan.

This is the second loan agreement the World Bank has made with India for improvement of rail transport. On an aggregate basis, this loan is the largest made by the Bank to a country in Asia and now makes India its largest borrower with loans totaling nearly $324 million.

INDIA LACKS MONEY BUT NOT LABOR FOR RAILROADS.

Jordan Mission Report

The report of a World Bank survey mission on the economic development of Jordan outlines a ten-year program of public investment designed to increase Jordan's productive resources, raise the standard of living, and reduce as far as possible the country's reliance on external financial assistance. The program is estimated to cost about $118 million, and would require continuation of foreign economic aid.

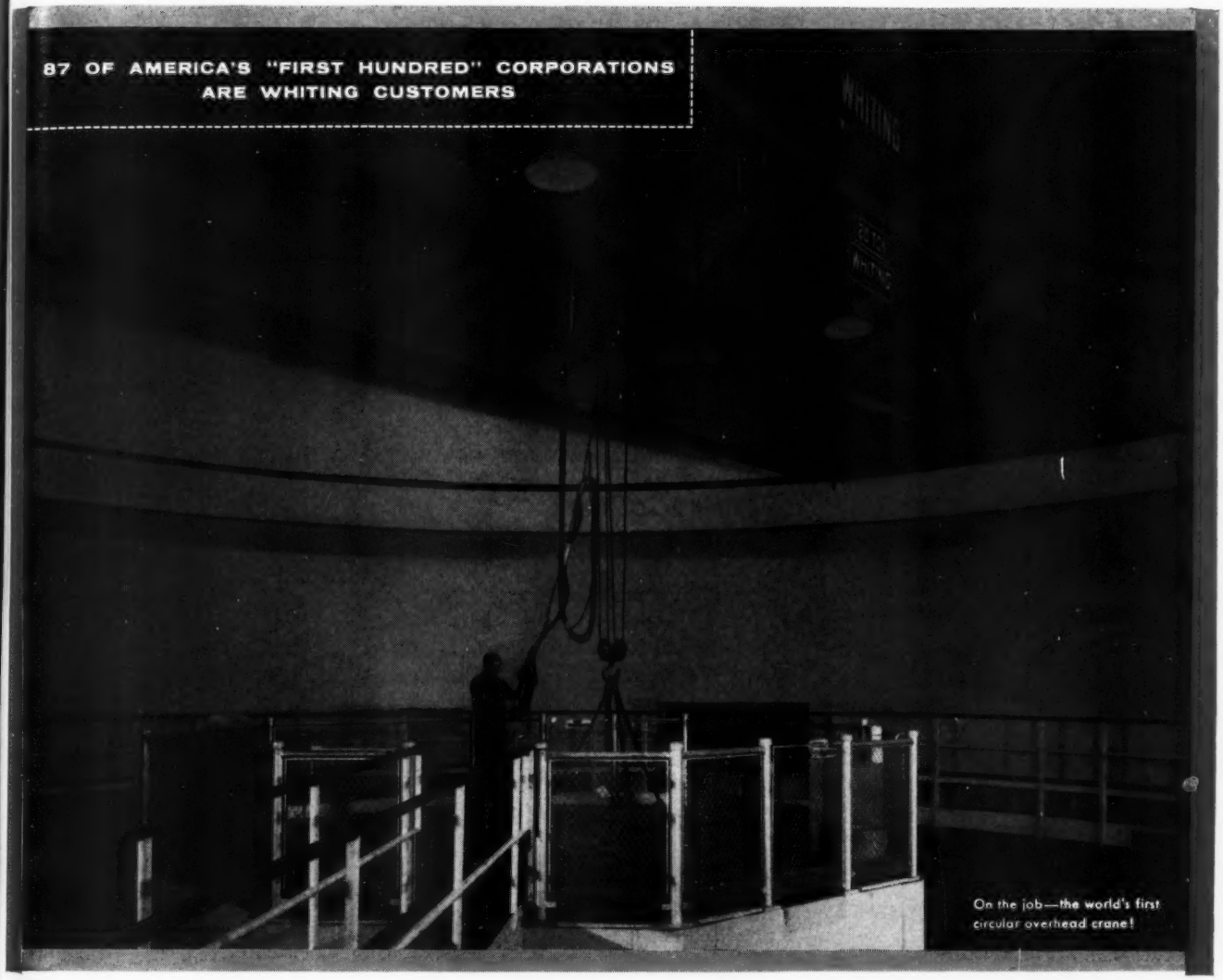
Somewhat less than half the cost could be financed out of the Government's own revenues, provided foreign aid is maintained at its present level. The group based its conclusions on the assumption that the Government would not have to bear the cost either of aid to Palestinian refugees in Jordan, or of defense expenditures previously met entirely by foreign grants.

Jordan for the most part is desert with all but a fraction of its 37,500 square miles too remote from water supplies to be irrigated. Yet it is primarily an agricultural country. Deposits of potash and phosphates do exist, but there are no known commercially exploitable quantities of coal, oil, or metallic minerals. With a few exceptions, industry has not progressed beyond the handicraft stage. Transport facilities are far from adequate.

First priority by the mission was given to agriculture since, in good harvest years, agriculture accounts for about half the total production of private enterprise. It suggested that Jordan proceed immediately with a scheme to irrigate about 24,700 acres in the East Ghor of the Jordan Valley and accelerate a program for development of underground water resources. Along with development of the land, establishment of a Farm Institute and concentration on agriculture schooling was urged.

A revival of Jordan's potash industry was recommended along with a rapid expansion of phosphate mining. Industrial ventures with good possibilities for success included a petroleum refinery with sufficient capacity to cover the country's requirements; a textile weaving mill of 100 to 200

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS
ARE WHITING CUSTOMERS



On the job—the world's first circular overhead crane!

At Argonne National Laboratory... the cranes that "couldn't be built!"

The world's first circular overhead cranes are at work, today. They're giving science a "lift" in two separate atomic projects at the Argonne National Laboratory, Lemont, Illinois. Operating on circular runways, each crane pivots about its axis, can reach everything within the building it serves. New in concept, these cranes that "couldn't be built" exemplify Whiting engineering ingenuity . . . prove again Whiting's ability to solve the most challenging overhead handling problems. Whether your needs call for the unique or the conventional, Whiting engineering custom-designs and builds the crane that will serve you best! *Whiting Corporation, 15620 Lathrop Avenue, Harvey, Illinois.*

For complete information, request our new full-color Bulletin 90, "Whiting Circular Overhead Cranes for Atomic Energy." Also available upon request, Bulletin 80 talks about Whiting cranes in general, shows why they are Industry's standard.

WHITING CRANES

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

looms; and several pilot olive mills, in addition to the olive oil refinery being established, designed to raise the quality of Jordan's olive oil.

It was suggested that co-financing of ventures that could not be undertaken by private capital alone be left, whenever possible, to the Development Bank of Jordan, after its reorganization.

More Rice for Indonesia

Work on the Djatiluhur Dam in Indonesia, begun in 1953, is now scheduled for completion in 1961. When completed it will be 295 feet high and 1148 feet long. The reservoir will contain 4 billion cubic meters of water. It will furnish 125,000 kva of electric power, irrigate 592,800 acres of rice fields, and regulate the floods of the Tjitarum River.

Ore Discoveries

Mineral prospecting in Soviet Azerbaijan has uncovered deposits of magnesium on the northeastern slopes of the Lower Caucasus, south of the famous Dashkesan deposits. Magnesium deposits are estimated at 20 million tons of high grade ore. There is also iron ore in the area estimated at a minimum of a billion tons.

Molybdenum deposits have been located in northeastern Azerbaijan. Quartz-molydenum seams have been found at a height of 3000 feet. Since roads are only in the planning stage, it is proposed to bring machinery by helicopter.

Deposits of copper and alunite have been located in the northwest. The first mine for extraction of alunite is already under construction in the area.

Australian Office Buildings

Sydney, Australia, very short of office space for its commercial and professional people ever since the start of World War II, is gradually overcoming this problem. Construction of two large buildings, announced recently, should help considerably.

The Metal Trades Employers Federation is to erect an 11-story building at a cost of about $1,000,000 at North Sydney. Consulting engineers are Stanley & Llewellyn. The building will have flat plate slab concrete floors supported on structural steel stanchions.

The other building, also at North Sydney, is for the National Roads and Motorists Assn. (NRMA). The steel and concrete framed building, 130 feet high with 30,000 square feet of floor space, will cost $750,000. Consulting engineers are Bye & Rooney, architects are Robertson & Marks.

Brick Made With Fly Ash

Fly ash from coal-burning power plants in Germany is being used as an admixture for building and insulating bricks made of baked clay. The fine ash is mixed with cleansed clay; 10 to 30 percent of clay by weight and 20 to 28 percent of water. As in the conventional method, the paste passes through a vacuum extrusion press and subsequently is shaped into bricks. The raw bricks are dryed and baked in the kiln, fuel being necessary only to start the furnaces to heat the first bricks, since the content of unburnt substance in the ash usually suffices to continue the process.

Strength and gross weight of the bricks can be increased by adding ground smelter ash, while by adding red-baked clay or by vitrifying the brick, a clinker with a clean and well-colored surface is obtained. Bricks made with an ash content of 70 to 90 percent conform to the standard requirements of relationship between resistance to pressure and gross weight.

Since fly ash has a low specific gravity, it is particularly useful in production of lightweight, heat-insulating bricks. A special system has been developed to produce baked porous bricks. Fly ash, cleansed clay, and some chemicals are mixed with leavening and solidifying agents, stirred to a viscous paste, and poured into a container. Within a certain temperature range, the leavening agent causes the paste to ferment until the solidifying agent, at the moment the fermentation process has

VIKING PUMP SUCCESS STORY

Viking Pumps have played an important part in the successful operation of this huge tank terminal at Galena Park, Texas, near Houston. General American Transportation Corporation handles 58 different liquid products there, using Vikings. Besides storage, they blend, barrel, drum and package liquids for customers. Their business continues to grow. Now they have added this new Viking, with 63,000 gallons per hour pumping capacity. It will load barges and ships, and do general transfer work, pumping benzol, gasoline, oils and other liquids. Let Viking Pumps help your business grow, too.

For information, see your nearby distributor, or write for section CP.

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps

See our Catalog in Sweet's Industrial Construction and Plant Engineer's File

NUMBER 2 OF A SERIES

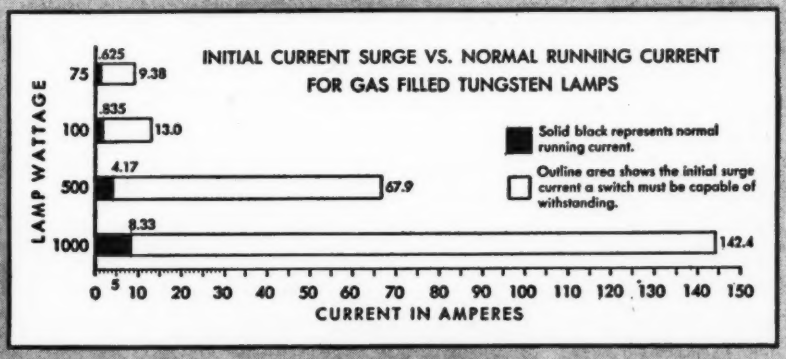
...why your Automatic Transfer Switch must close safely on inrush currents 20 times full load rating

On tungsten lamp loads... initial current surge may be almost 20 times normal running current...

...and current drawn by a 1,000 watt lamp load (for example) does not return to normal for 0.23 seconds!

How Long Until Current Returns To Normal?

Lamp Wattage	Time for Current to Reach Maximum Value	Time for Current to Fall to Normal Value
	Seconds	Seconds
75	.0004	.07
100	.0007	.10
500	.0014	.15
1000	.0031	.23



Inadequate capacity to withstand these currents would result in contact welding, causing the switch to be inoperative. Good engineering practice demands a switch capable of withstanding inrush current 20 times full load rating.

ASCO automatic transfer switches can safely close on inrush currents over 20 times switch rating!

...and ASCO Switches have the thermal capacity to carry not less than 20 times full load current for one second!

Overall extra design plus positive opening and closing permit this uniquely high current making capacity. This capacity prevents welding of contacts on high inrush current and insures proper switch operation. Smaller capacity switches will weld on high inrush currents, creating the hazard they were intended to eliminate – complete service outage.

ASCO Transfer Switches transfer the connected load from normal to emergency supply when normal fails, or is substantially reduced. Upon restoration of normal, the Switch will retransfer the load. ASCO Switches need not be derated:

1. **For Tungsten Lamp Loads**
2. **When Enclosed in a Cabinet**
3. **When Used for Continuous 24 Hour Duty.**

The extensive ASCO line includes an Automatic Transfer Switch for every requirement – 10 to 1200 amperes–up to 750 Volts AC or DC.

Write for Catalog 57-S1, and for Publication 596 describing how to select Automatic Transfer Switches.

Automatic Switch Co.

50-CC Hanover Road, Florham Park, New Jersey

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ASCO®

reached its climax, solidifies the mass. Once dry, blocks are baked and then sawed to any desired shape or size. Heat transmission of these porous blocks is less than that of porous concrete.

Swiss Dam Started

Newest addition to Switzerland's hydroelectric power stations will be Goschenenalp Dam now under construction in the southwest. When completed, the dam will add 320 million kilowatt hours to the country's power supply.

Although the Swiss Alps are dotted with power stations — some 6000 of them altogether — they still cannot meet the demand for power during the cold months when the glaciers do not melt rapidly enough to feed water to the hydroelectric plants. In 1956 Swiss power stations delivered 13,699,000,000 kilowatt hours for public consumption. Last year there were 17 new hydroelectric stations under construction, trying for a production of 15 billion kilowatt hours by 1960. But if the country's industrial development continues at its present rate, it is probable that they will still be obliged to import power during the winter and pay for it by exporting when it is plentiful during the summer.

All this power is consumed to a great extent by the transportation system of 3140 miles of electrified railways and by an estimated 11,000 factories of all sizes employing from only a handful of workers up to as many as 7000.

Before work could begin on the dam, an entire village had to be moved to a new site. Contractors are now at work moving more than 11 million cubic yards of earth and stone to construct the rock-fill dam.

Copper Slag Bricks for Paving

Copper slag bricks and blocks, cast in sheet molds from copper slag, are being used widely in The Netherlands. The material is hard and rugged and is highly resistant to pressure and wear. It also is resistant against frost and against the influence of acids, salts, and sea water. The bricks have a high bearing capacity and high sound absorbency — important properties for a road surface. The copper slag material is particularly suitable for street paving of all kinds. For mixed traffic in residential streets, yards, and gasoline stations, bricks can be laid without special foundations. Roads with heavy traffic can be paved with layers of cobbles 6¼ x 6¼ inches and 4 inches thick laid in a cross pattern. For this purpose, special jointing stones are available.

In heavy industry, such as in blast furnaces and rolling mills, where very high traffic loads occur, heavy slabs are used, 12 x 12 inches and about 4½ inches thick. For particularly heavily loaded floors, cobbles are supplied in cubic shape, 6¼ inches on a side.

For the paving of parking sites and storage sheds, thinner slabs can be used, about 12 x 12 inches and less than 3 inches thick.

Copper slag material in the form of blocks of various shapes and sizes is also used for numerous other purposes — such as the revetment of dikes, breakwaters, and groynes, for the making of quay walls, sunk mattresses, and covering slabs.

Orinoco Project Expanded

The Venezuelan government has signed an agreement increasing the value of its huge Orinoco integrated iron and steel project from $200 to $300 million. The increase calls for an expansion of the plant's initial annual ingot capacity from 464,000 to 770,000 tons. The project will include port installations on the Orinoco river, rail, road, and conveyor-belt facilities, office buildings, laboratories, and training and recreational facilities. A foundry will be provided to make 55,000 tons of cast iron products annually.

Consultants to the Venezuelan government for over-all inspection and control work are Ramseyer and Miller, Inc., New York.

Initial operation is planned in the first half of 1958, with full

Neff & Fry Bin Being Erected for Handling Silica Sand

When photographed, this Neff & Fry Super-Concrete Stave Bin was being erected for the Ottawa Silica Co., Ottawa, Ill. It is the first of two 28′ x 40′ bins which are now completed and in use. Silica sand is supplied principally to glass manufacturers, foundries, and concrete producers.

Through our experience in building thousands of bins, we have mastered the techniques of handling and storing virtually all kinds of flowable bulk materials. This knowledge is at your service upon request. You are invited to communicate with us.

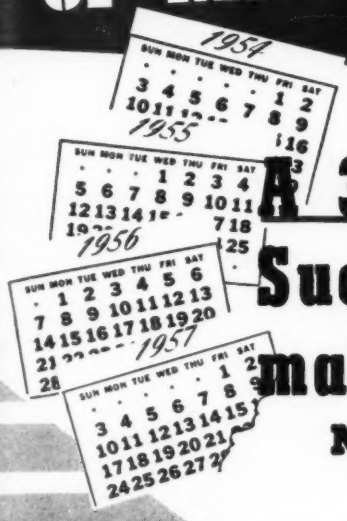
To understand the special advantages of our unique type of construction, ask for our folder, "Bins with the Strength of Pillars."

NOT EXPORTED EXCEPT TO CANADA AND MEXICO.

THE NEFF & FRY CO. • 302 Elm St., Camden, Ohio

NEFF & FRY ➧ SUPER-CONCRETE STAVE STORAGE BINS

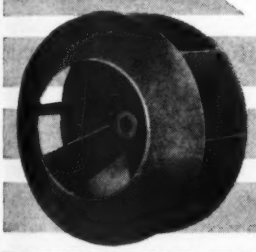
When the Job Calls for AIR or MATERIALS Handling...



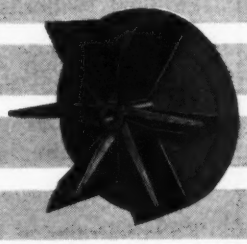
A 3-YEAR BACKGROUND of Successful Installations...

makes New Bayley "EX" FANS

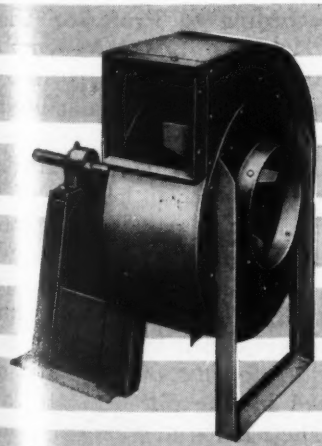
your logical choice!



Bayley Style "AN" Air-Handling Wheel



Bayley Style "GP" General Purpose Fan



Bayley Standard Type "EX" Fan

Engineered Air-Handling Equipment

With a performance record extending over a period of three years, since the introduction by BAYLEY of the Type "EX" Fan, a story of outstanding success in a wide variety of applications has proved the dependability and efficiency of this precision-built equipment.

FEATURES LIKE THESE . . .

Show WHY "BAYLEY" Fan Installations Provide Peak Performance . . .

- **PRECISION COMPONENTS** — for Maximum realized fan efficiency
- **STANDARD BASIC DESIGN** — readily modified with standard accessories to meet any special application
- **RUGGED CONSTRUCTION** — employing the use of standard alloys, predominantly welded assemblies, approved-protective treatment.

WRITE For Complete Bayley "EX" Fan Manual Today

Bayley BLOWER COMPANY

production scheduled for 1960. First to go into production will be a seamless pipe mill, which will utilize imported billets until the plant is ready to produce its own. Other finished and semi-finished items to be produced include rails, reinforcing rods, structural shapes, and wire products. Flat products will be added in the next phase of the project. The second most important single item in the plant's initial output will be deformed corrugated bars, of which 108,000 tons will be produced yearly for reinforced concrete construction.

Located near Puerto Ordaz on the Orinoco, near its juncture with the Caroni River, the plant will be linked with the Cerro Bolivar iron ore developments. The mill will utilize 1,160,000 tons of iron ore yearly, 428,000 tons of coal, and 218,000 tons of limestone from a nearby quarry, along with 264,000 tons of scrap.

To permit almost complete reliance on local sources of raw material, the plant will utilize low-shaft electric pig iron smelting furnaces rather than conventional blast furnaces. In these units, heat is supplied by electrical energy, the coal producing only a reducing atmosphere, making posible the use of lower-grade coking coal of local origin.

Electrical energy will be supplied by the Caroni River hydroelectric project now being carried out by the government.

Electronic Microscope

The French company *Optique et Precision de Levallois* has perfected a new electronic microscope whose characteristics include enlargement varying continuously between 1000 and 60,000 times, joining with the optical microscope below and making possible a fine degree of determination without breach of continuity. Acceleration voltage of the electrons is 50, 75, and 100 kv.

The microscope may be operated at large determination diffraction, or at localized diffraction for studying micro-structure. Adjustments are very easy. The image produced may be examined directly on the screen or by means of a binocular magnifying glass. Focusing is therefore easier for photographic purposes.

It is expected to find use in both industrial and scientific laboratories, for all types of scientific research, such as metallography, surface study, and abrasion problems; extrusion and corrosion; chemical compositions and structure; study of catalytic agents and chemical reactions; cement research; and botanical, bacteriological, and medical and surgical research.

Aerial Survey School Opens

The new building of the International Training Center for Aerial Survey at Delft, The Netherlands, has been opened officially. At this institute technicians will receive a one-or two-year special training course in aerial survey work, including mapping of areas by means of aerial photos and interpretation of the material obtained for geological and soil surveys. The Center can accommodate 50 students.

The building has nine floors, four of which are equipped for scientific work. One floor is used as the residential quarters of the directors of the institute, and four floors for housing the students.

Radioisotopes in Mining

According to Professor Vladimir Dakhnov, of the Moscow Oil Institute, the USSR is making widespread use of radioactive isotopes for investigation of mineral, coal, oil, and gas bearing strata. A team of the Ural branch of the Academy of Sciences, for instance, has perfected a method of locating coal seams by gamma ray dispersion. An instrument that emits gamma rays is lowered into a mine shaft. Intensity of the rays dispersed by the different strata in the shaft helps to locate the seam and, with other geophysical methods, makes it possible to start efficient mining of coal seams without first drilling and bringing up

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Don't let power failure leave hospitals, schools, stores, public and commercial buildings unprotected

Put Kohler electric plants in your specifications to insure stand-by power when storms or accidents cause central station stoppage.

Hospitals need Kohler plants for operating room lights, nurses' call bell systems, iron lungs, sterilizers, equipment vital to patients' care. Schools, stores, theatres use them to prevent sudden darkness; homes for automatic heat, water systems, refrigeration. They prevent costly interruptions in countless enterprises. Civil Defense units need them for first aid stations, fire and rescue trucks, mobile hospitals. Sizes 1000 watts to 50 KW. Write for specification data 22-D.

Model 35R81,
35 KW, 120/208 volt AC.
Remote starting.

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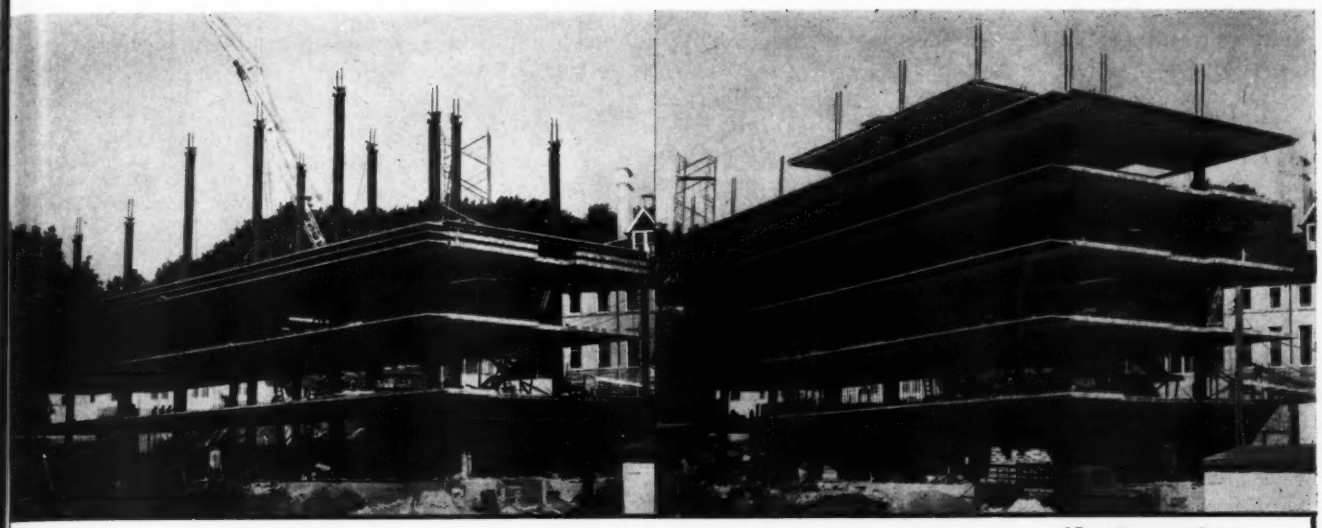
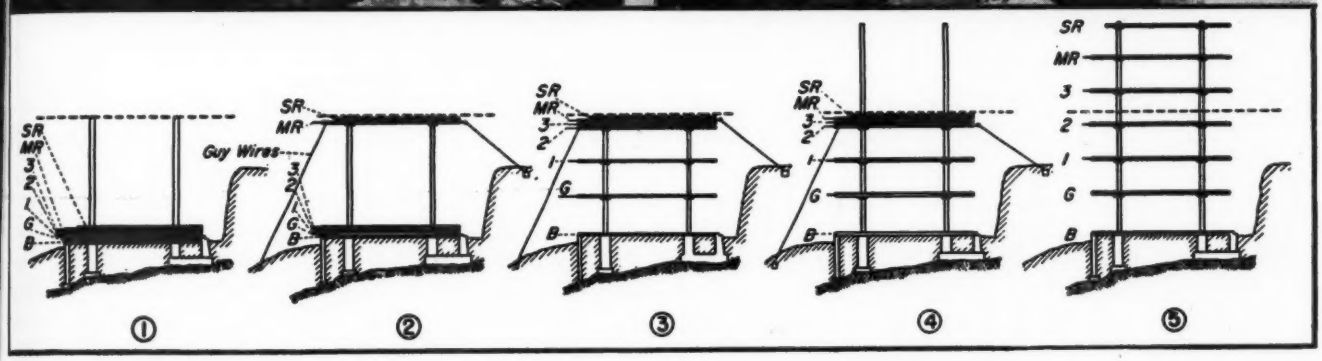
Plumbing Fixtures • Heating Equipment • Electric Plants • Air-cooled Engines • Precision Controls

KOHLER OF KOHLER





Why They Used PLASTIMENT in this 6-Story Prestressed Lift-Slab

Combining two recent construction and design techniques—lift slab and prestressing—the Litchfield County Hospital at Winsted, Connecticut is an outstanding example of advanced engineering.

Concrete of uniform high quality was essential to the success of the project. According to the engineer:

"Plastiment was added to the concrete to reduce the amount of water and shrinkage and to improve workability."

Plastiment has been selected by engineers for many outstanding projects because of its proved ability to increase concrete uniformity and strength, improve placeability at low slump, and reduce cracking.

Let Plastiment work for you. Write or call today for information.

Structural Engineer—Marchant and Minges—West Hartford, Connecticut
Architects—Sherwood, Mills & Smith—Stamford, Connecticut
General Contractor—A. F. Peaslee, Inc.—Hartford, Connecticut
Lift Slab Contractor—New England Lift Slab Corp.—Hingman, Massachusetts
Prestressing Consultants—Freyssinet, Inc.—New York, N. Y.

Sika

PLASTIMENT® CONCRETE DENSIFIER

SIKA Chemical Corporation, Passaic, New Jersey

DISTRICT OFFICES: BOSTON • CHICAGO • DALLAS • DETROIT • PHILADELPHIA • PITTSBURGH • SALT LAKE CITY • WASHINGTON, D. C. • DEALERS IN PRINCIPAL CITIES—AFFILIATES AROUND THE WORLD

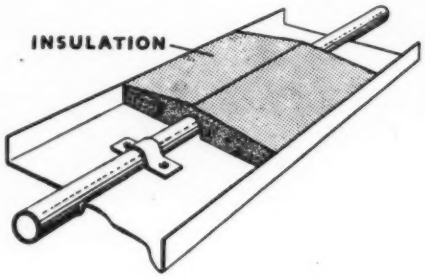
samples of minerals to the surface for analysis.

Last year, geographical survey teams surveyed more than 4000 miles of strata. Use of radioisotopes has increased drilling efficiency in the Volga-Ural coal fields, freeing geologists from the need of drilling and extracting thousands of cubic yards of rock.

At a recent conference in Moscow on use of both stable and radioactive isotopes in science and industry, a paper presented by a Dr. Zaporozhe reviewed work done by scientists at the Geophysical Institute on more efficient ways of interpreting findings of such surveys and improvements in apparatus used for this purpose. The paper also reviewed future prospects of nuclear research using neutron generators. The method described makes it possible to create a force of neutrons in the shaft hundreds of times greater than is now used. Employment of these neutro generators for discovering mineral deposits safeguards service personnel against effects of radiation.

Space Heating Panel

The illustration shows a simple form of sectional space heating panel for mounting on ceilings in



factories and offices. Each section of panel is a shallow channel of pressed steel, 10 feet long, 10 inches wide, and about one-half inch deep, which is clipped to the underside of a heating service pipe in the manner shown. To obtain good thermal contact between panel and pipe, the panel is slightly recessed to receive the pipe. Preformed slabs of insulating material prevent loss of heat from the pipe except to the exposed shell. Any number of units can be used end to end to make a continuous run of panel of the length desired. The panel was developed by the Brightside Heating and Engineering Co. Ltd., Birmingham, Eng.

Form New Association

The H. K. Ferguson Co., Cleveland, Ohio, engineers and constructors, and John Laing & Son Ltd. of London, one of Great Britain's largest construction-contracting organizations, have formed a new association under the name Laing-Ferguson, with headquarters in London, England. The firm's complete services, which will be executed under a single responsibility, will include everything from industrial plant site location and preliminary engineering through detailed design, construction, and equipment installation to plant start-up.

Gas Detector

The staff of the Institute of Mining of the Ukrainian Academy of Sciences and the Mine Ventilation Laboratory have designed jointly a new gage for detecting explosive gas in mines. The apparatus is connected to a general alarm system and is so sensitive that it is set in motion by as little as 0.05 percent of methane gas in the air. As the concentration of gas in the air increases, so does the current inside the apparatus. When the concentration reaches 2 percent, the current activates a relay system that starts up the sirens. Within one to two minutes, electric power is cut off from the mining machinery.

System to Link NATO Nations

Supreme Headquarters Allied Powers Europe have signed contracts for the engineering and installation of one of the most modern and extensive military communications systems in the world. The new network will combine over-the-horizon tropospheric forward scatter and line-of-

SPECIAL DELIVERY for liquids and gases in all branches of industry is assured with Kraloy Rigid Polyvinyl Chloride (normal and high impact) Plastic Pipe... with virtually no maintenance or policing. You install Kraloy PVC—and forget it. That's why millions of feet of Kraloy Plastic Pipe are in use today, because Kraloy PVC is inert and can never rust, rot, or corrode, is not subject to electrolytic action, handles abrasives, slurry and most Ph factors, is scale resistant. Superior flow characteristics (C factor = 150+) permit use of smaller diameters. Installation costs 50% less, due to light weight and ease of handling.

Write for complete information and literature.

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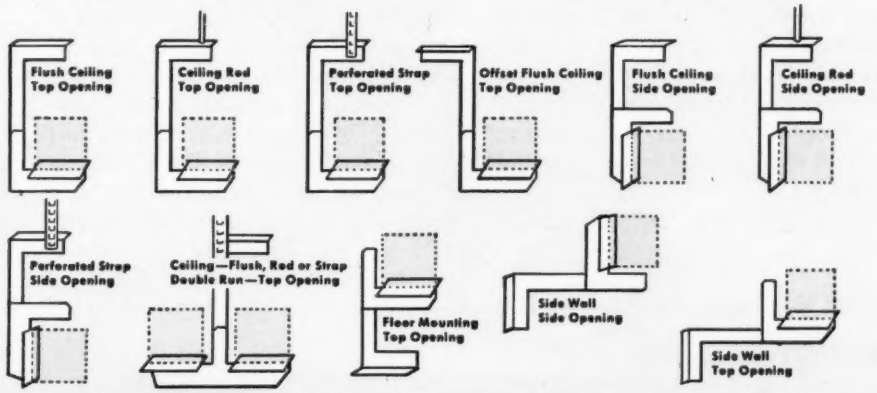
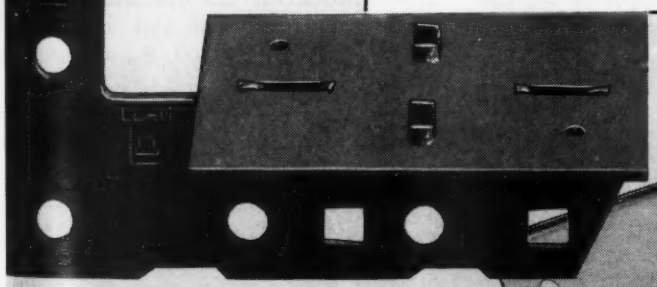

Flush Ceiling Top Opening
Ceiling Rod Top Opening
Perforated Strap Top Opening
Offset Flush Ceiling Top Opening
Flush Ceiling Side Opening
Ceiling Rod Side Opening
Perforated Strap Side Opening
Ceiling—Flush, Rod or Strap Double Run—Top Opening
Floor Mounting Top Opening
Side Wall Side Opening
Side Wall Top Opening



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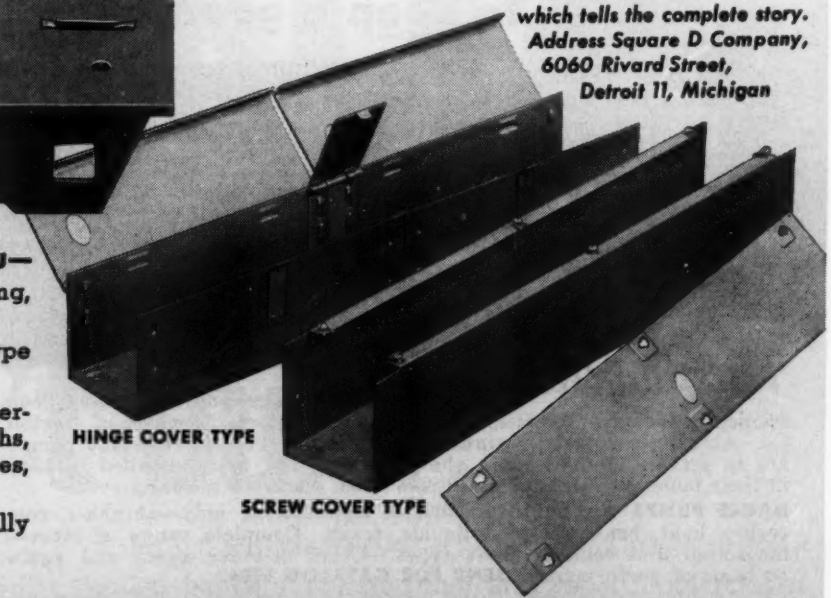

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—more rigidity. New joint design actually *triples* duct strength.

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sight radio relay links to further integrate, from a communications viewpoint, certain international and national military agencies and installations extending from eastern Turkey, around the broad crescent, throughout NATO Europe, to the far reaches of northern Norway.

The center of the system will be in Paris. Planning, engineering, and general supervision will, in the larger part, be conducted from Paris also. In addition, there will be field teams for testing, exploration, installation, and supervision of construction.

Montreal Harbor Improvement

A $57 million program of capital works for Montreal Harbor has been approved by the Canadian government. Some of the work has already been completed, and some is under construction or being planned. Contracts amounting to $17.6 million had been awarded by May 1.

Need for the new facilities arises from changes in transportation that will be brought about by the St. Lawrence Seaway. The program of capital works, and the value already awarded (bracketed), is classified as follows:

Grain elevators — $27 million ($6.6 million)

Wharves and piers — $17 million ($6.4 million)

Transit sheds — $5 million ($1.1 million)

Dredging and navigation channels $7.5 million ($3.5 million)

Miscellaneous — $500,000.

Under, Not Around

The 11-mile tunnel project under 15,671-ft Mont Blanc, France, has been approved by the French National Assembly. The tunnel would provide motorists with a direct, all-weather road between central France and northern Italy. At present, the round-about, time-taking route between Paris and Rome is by way of Coite d'Azur. Each year, from October into May, both the Grand and Petit Saint-Bernard passes are impassable. Even without snow, the Simplon Road is dangerous, although improvements are now under way.

Cost of the work will be approximately $25 to $30 million, with France paying more than half, Geneva contributing $2 million, and Italy paying the rest.

New Iron Ore Harbor

Luossavaara-Kiirunavaara AB (LKAB) is planning to build an iron ore harbor at Sandoklubb, on a tiny island 10 miles off Lulea, in northern Sweden. Costs will exceed $20 million and work will last 3 to 4 years. Additional time will be required for the building of a rail spearhead, bridges, and roads, as well as harbor installations. Track-laying will be by SJ, the state-owned railways.

The currently used Lulea harbor can only accommodate 13,000-ton vessels during the open water season (mid-May to mid-December), while the Sandoklubb project will handle 35- and probably 40,000-ton ore carriers. At the rate of 6000 tons an hour, a minimum of 6 million tons a year will be loaded at Sandoklubb. Lulea harbor now requires 450 to 550 workers for its operation, while Sandoklubb will cut down the labor force by 200. Sando is now an almost deserted island of scattered farmers and summer vacation residents.

The Swedish consulting firm of Kjessler & Mannerstrale AB has done the offshore foundation tests, 100 feet deep and as far as 1300 feet at sea, for the planned multi-span bridge of 1076 feet in length. Bengt Axelson, chief engineer of LKAB and supervisor of the project, intends to consult several firms about the water problems.

DC or Not To Be DC

Work on electrification of the railway track between Tambaram, sixteen miles from Madras City, and Villupuram, India, has been halted pending a decision on whether the system will use 1500-v dc, as originally planned, or 15,000-v ac. The project has already been started, platforms raised, substations constructed, and tenders for supply of rolling stock called for. The d-c system would

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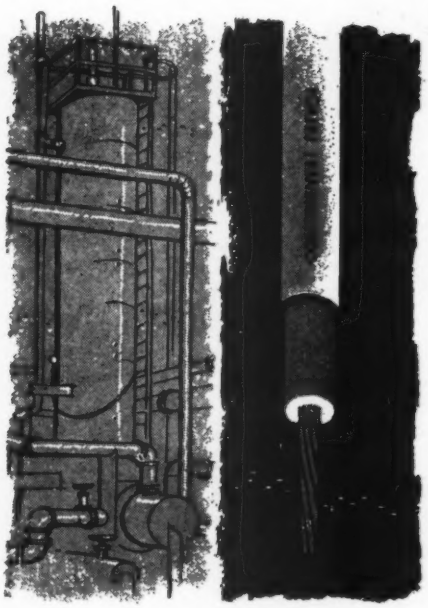

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cost approximately $8 million. Proponents of the a-c system claim that it would result in a saving of half that. A delegation will be sent to Europe to study the performance of a-c traction there, according to Jagjivan Ram, Minister for Railways. The railway board is considering utilization of railway equipment and d-c rolling stock, ordered for the Calcutta area, in some other place, such as Bombay.

Canada Ups Electric Power

Generating capability of Canada in 1956 amounted to 14,983,000 kw, an increase of 5.9 percent over the preceding year's total of 14,147,000 kw, according to the Dominion Bureau of Statistics. The report forecasts that generating capability in Canada will be 22,111,000 kw by 1960, an increase of 47.6 percent over 1956, while it predicts that the proportion of thermal generation to the total will rise from 14.3 percent in 1956 to 19.5 percent in 1960.

Canadians have one of the lowest electricity rates per kilowatt hour in the world. In the United States the average revenue per kilowatt hour sold to residential or domestic customers was 2.64 cents in 1955 against 1.66 cents per kilowatt hour in Canada. Commercial and industrial sales in the U.S. averaged 1.3 cents per kilowatt hour compared with 0.7 cents for Canada.

Progress on Micro-Wave System

First stage in the provision of a $9 million television micro-wave link between St. John's, Newfoundland, and Sydney, Nova Scotia, to achieve a trans-Canada coast-to-coast TV hook-up, has been completed with the opening of a new Canadian National Telegraphs Communications center in the Newfoundland capital.

Built at a cost of $1.5 million, the new center will provide telegraph, telephone, and radio communication between Newfoundland and Canada's remaining provinces and the rest of the world.

The micro-wave link will be completed in 1958 when radar-like towers, up to 220 feet high, will bridge the gap between St. John's and Sydney to complete the Canadian Broadcasting Corporation's hook-up from Victoria, B.C., to Newfoundland.

Communications Carrier

The French National Center of Telecommunication Study is working on a communications carrier said to be far superior to the coaxial cable. By means of "wave guides," a precision-milled, tube-like affair, it may be possible to relay 20,000 simultaneous telephone conversations instead of the present 960. An experimental installation has been laid down over a short distance in central France.

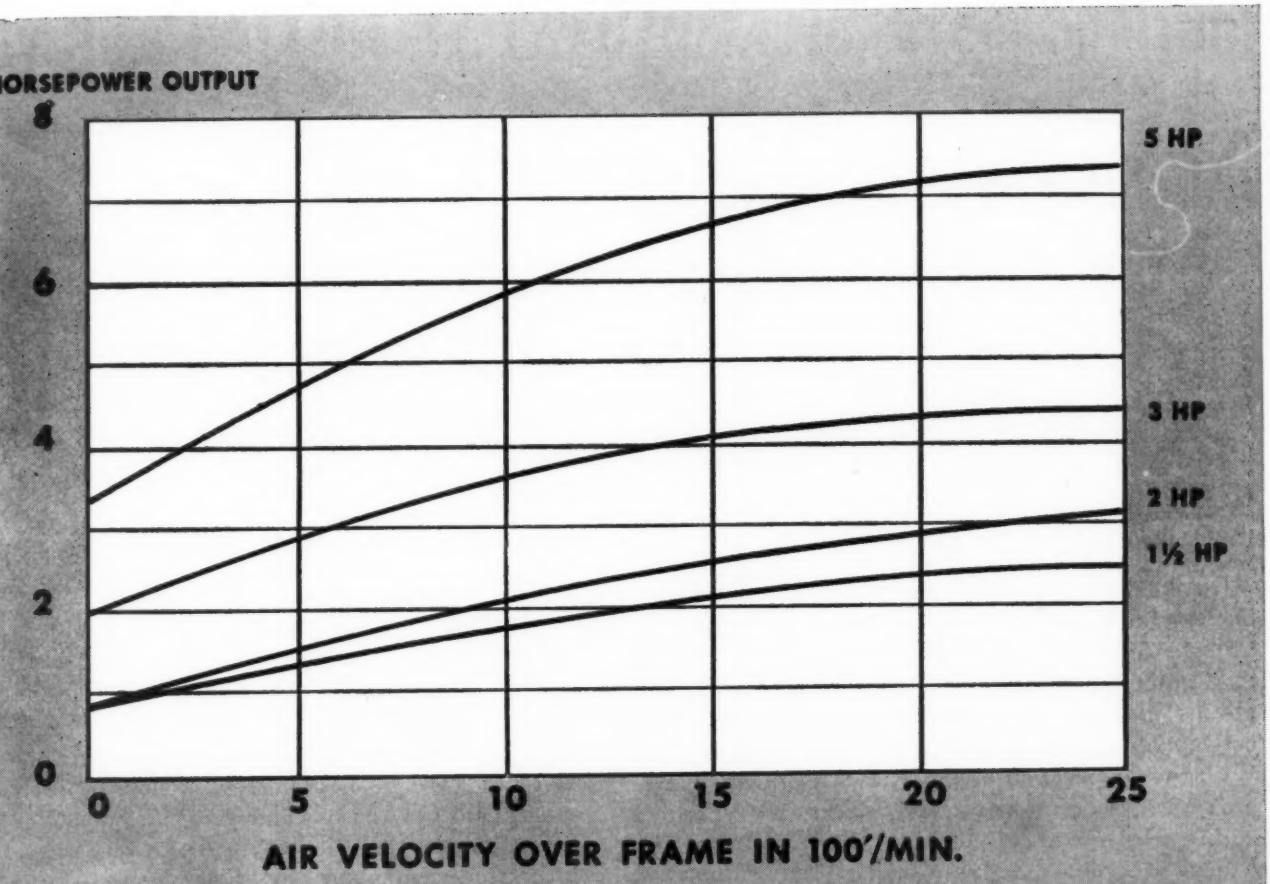
Replace 1884 Bridge

The New South Wales Australia Main Roads Department is calling for tenders for construction of a bridge over the Parramatta River, at Gladesville, to replace the existing structure erected in 1884. Including the approaches, length of bridge will be 1901 feet with 72 feet between curbs. The project will take about 3½ years to complete.

Glacier Power

The famous glacier on Mont Blanc, known to tourists as the Mer de Glace, is to be harnessed to provide electric power for France. The river flowing beneath the glacier will be tapped at an altitude of 4700 feet. Water will be drawn off through a mile-long tunnel to a point where high pressure pipes will carry it down a sharp drop of some 1200 feet to an underground power station in the valley of Chamonix.

A similar scheme has been worked out for the glacier of Argentiere, on the other side of Mont Blanc. Here the fast-flowing water beneath the glacier will flow from a height of over 6500 feet through a series of tunnels 27 miles long to the Emosson Basin on the Franco-Swiss border, where a large dam is to be constructed. From the dam, water will be channelled to two power stations on the other side of the Swiss frontier. This electricity will be distributed equitably between France and Switzerland. ▲▲



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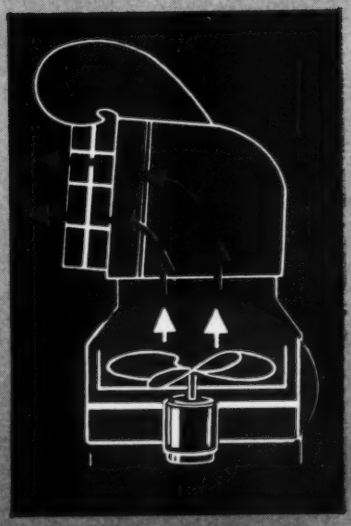
Reliance Air-Over Motors are available from ½ through 40 horsepower—720, 900, 1200, 1800, or 3600 rpm. Common horsepower ratings are available from stock.



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News for the Consultant

Recruiting Practices Code Published by ASEE

During the June 1956 meeting of the American Society for Engineering Education, the Engineering College Administrative Council of the Society and the Committee on Ethics reviewed irregularities and abuses that had developed in the recruitment of college seniors by industry and engineering firms. With the cooperation of the Midwest College Placement Association a new code, "Recruiting Practices and Procedures," was developed this year for use by college faculties, placement officers, and employers. The code has been published in paper-back form for 25¢ a copy and is available from W. Leighton Collins, Sec'y., ASEE, University of Illinois, Urbana.

Under employer responsibilities are listed such requirements as:

¶ Informing the student within two weeks of the interview whether or not he will be hired.

¶ Giving the student ample time to consider offer.

¶ Providing suitable literature describing the company's operation.

¶ Avoiding elaborate entertainment and overselling.

¶ Sending a copy of all correspondence with students and faculty to the placement office.

¶ Not offering special payments, gifts, bonuses, or other inducements.

¶ Engaging every student who accepts the company's offer of employment.

The college's responsibilities in the new code include adequate notification to prospective employers as to number and type of students available, and keeping the students informed as to what firms are planning interviews. It is suggested that faculty members familiar with each student be available to the interviewer and that individual student's records also be available.

The code urges students not to "hoard" job offers, but promptly to decline unwanted offers and not to accept invitations to visit an employer's plant or headquarters unless sincerely interested in an offer from that employer.

DAVID B. STEINMAN LOUNGE AT UNIV. OF FLORIDA IS DECORATED WITH MURALS OF STEINMAN BRIDGES.

Interstate Highway Plans Underway for Memphis Area

The Memphis area interstate highway program has moved further into the design phase with the signing of an agreement by the Tennessee Department of Highways and Public Works and the St. Louis city planning and civil engineering firm of Harland Bartholomew & Associates. The engineering firm of Clark, Daily and Dietz, of Urbana, Ill., is associated with the Bartholomew firm in the work, which is to cover approximately 37 miles of the proposed Interstate Highway System in Memphis and Shelby County, at a cost of about $140 million.

Included in the new agreement are north-south

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cuts assembly time, permits fast repositioning of shelves —gives you these plus features

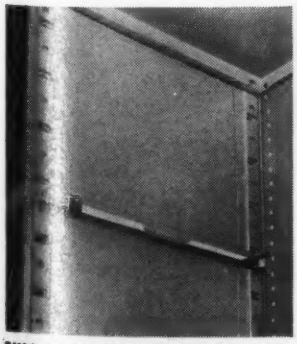
STRAIGHT-IN, STRAIGHT-OUT SHELF CHANGE. No tilting. No dismantling. No interference with any other shelf.

INDEPENDENT SHELF POSITIONING. Each shelf can be repositioned individually in seconds.

FULL USE OF SHELF AREA. No tees or angles, and beaded posts save valuable space.

COMMON SIDE PANELS AND POSTS save material between adjacent units in a rack. Back and side panels are one-piece.

BEADED POSTS AND FLANGED SHELVES prevent snagging of clothing or stored goods, protect workers.

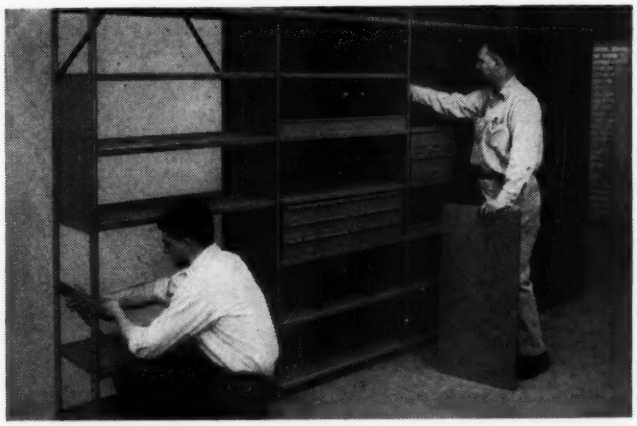


FULL DEPTH SHELF SUPPORT. No buckling possible. Reinforcements can be added when required.

4 CLASSES OF SHELVES. Regular, medium, heavy and extra-heavy construction meets all load requirements.

No matter what type of shelving you need—open, closed, bin units, ledge units, counters or cabinets—new Hallowell ERECTOMATIC® steel shelving makes the job easy. The unique built-in locking device*—developed by SPS—speeds assembly and rearrangement of shelves. To position a shelf, slide it into place on the shelf supports, press the locks, and the shelf is locked. To reposition a shelf, release the locks, pull the shelf straight out, slide it straight in on its supports at the new location, and press the locks. It takes only seconds to do the complete job. Made of prime steel, phosphate coated, and finished in SPS green baked-on enamel—other colors are available. Hallowell ERECTOMATIC steel shelving is stocked by leading industrial distributors and shop equipment dealers. For complete information, see the one nearest you. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL Co., Jenkintown 66, Pa.

*Patent applied for



TWO MEN ASSEMBLED new Hallowell ERECTOMATIC steel shelving in just over 10 minutes. Closed unit was 36 in. wide, 18 in. deep, 7 ft. 3 in. high, complete with seven shelves. Standard models of other design required 13-55 min. Table shows test results.

Brand	Time to Assemble (Min.)	Units Per Hour
Erectomatic	10.42	5.75
A	13.23	4.53
B	14.24	4.21
C	16.30	3.68
D	18.12	3.31
E	25.03	2.40
F	55.03	1.09

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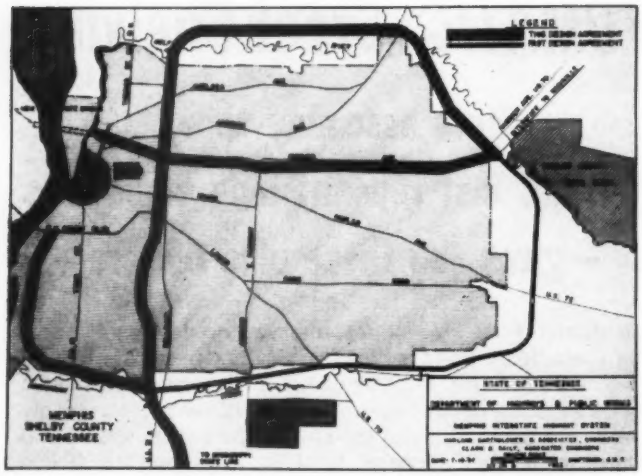

HEAVY LINES SHOW ROUTE COVERED BY NEW AGREEMENT: LIGHTER LINES ROUTE NOW UNDER DESIGN.

and east-west axis routes through the city, the north portion of the circumferential route, and the southwest section of the circumferential route extending south to the Mississippi state line. The southeast part of the circumferential route is already in the process of design under an earlier agreement with the Bartholomew firm and its associated engineers.

Location of the routes was determined after a study by Harland Bartholomew & Associates in 1955, which took advantage of extensive earlier work done by the firm on comprehensive plans for both the city of Memphis and Shelby County.

Memphis has grown rapidly since World War II, and highways have not kept pace with over-all expansion. Surveys indicate that traffic flow over Memphis area streets and highways will increase to 215 percent of the present traffic level by 1975, as the area's population grows to 850,000 from the present 525,000. The new interstate system is designed to anticipate this increase and to grow with the expanding demand. Planned to be built initially with four and six lanes, the system is designed to become a full six-and eight-lane facility in stages as traffic increases require.

The area in greatest need of traffic relief is the central business district, with its dense land coverage and high land values. The Bartholomew solution provides maximum service for vital areas, with minimum disruption to existing city development, and avoidance of excessive right-of-way costs. The two internal routes, with the existing E. H. Crump boulevard, provide three sides of a much needed central business district loop.

Another part of the problem is the Memphis-Arkansas Bridge, the only bridge across the Mississippi

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in Tennessee. Located about a mile south of the Memphis central business district, the bridge attracts a large volume of traffic to the same section which already acts as the chief origin and destination of traffic flow for the entire metropolitan area. A new $37 million bridge, proposed about 2½ miles north of the existing bridge, is expected to relieve the present load on the Memphis-Arkansas Bridge and to provide a better pattern of traffic flow on both sides of the river. The new expressways are being designed in anticipation of the new bridge.

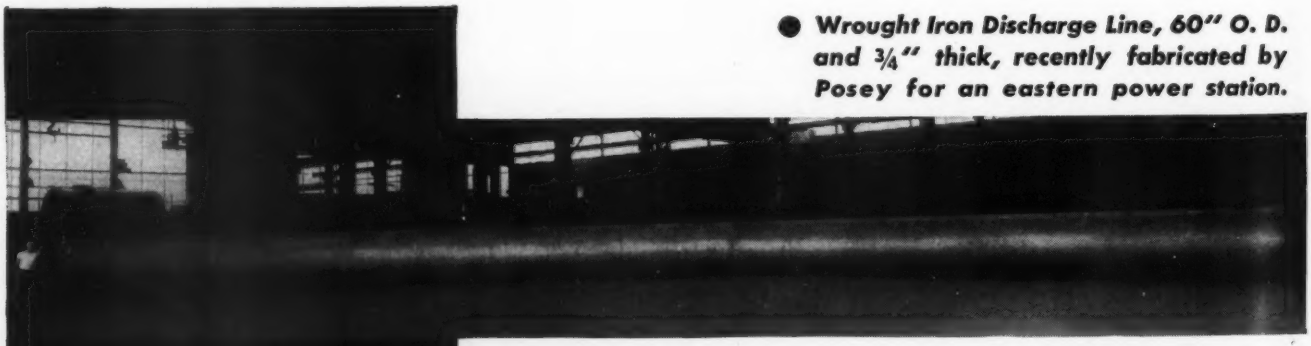
With this design agreement with the Bartholomew firm, Memphis will be in a relatively favorable position as compared with many American cities on its Interstate Highway program. This was made possible because the city and the Department of Highways and Public Works had commissioned the earlier location studies well in advance of Congressional enactment of the Federal Interstate Highway program. The new agreement calls for preliminary studies, designs, plans, and surveys to be completed within 18 months, but the work will be finished in sections and turned over to the department as it is completed. Thus actual acquisition of right-of-way for some portions of the routes could begin well before the expiration of the contract period.

Translucent Plastic Roof Tops U.S. Pavilion at Brussels

The United States Pavilion being built for the 1958 World's Fair in Brussels, Belgium, will be capped by an innovation in roof design — a translucent plastic roof designed to resemble a bicycle wheel, 380 feet in diameter. The overhanging roof has an outer rim of reinforced concrete connected to an inner metal ring (the hub of the wheel) by two layers of high tension steel cables 2¼ inches thick. The cables, resembling the spokes of a wheel, are tightened by turnbuckles and are held in tension by weight of the 66-ft diameter inner ring.

The cables will be topped by a translucent plastic roof made up of structural panels produced by the Kalwall Corp., Manchester, N. H. Made of glass fiber reinforced plastic sheets bonded to an aluminum grid, the panel is a sandwich 1/7th the weight of an equivalent metal section. These panels form a donut-shaped band 128 feet wide around the center ring. Circling the plastic roof is the 54-ft wide concrete rim which rests upon two concentric rows of gold-colored steel columns.

To attach the panels to the cables, Kalwall devised a special joining system. Steel purlins were designed to straddle the cables at 10-ft intervals —



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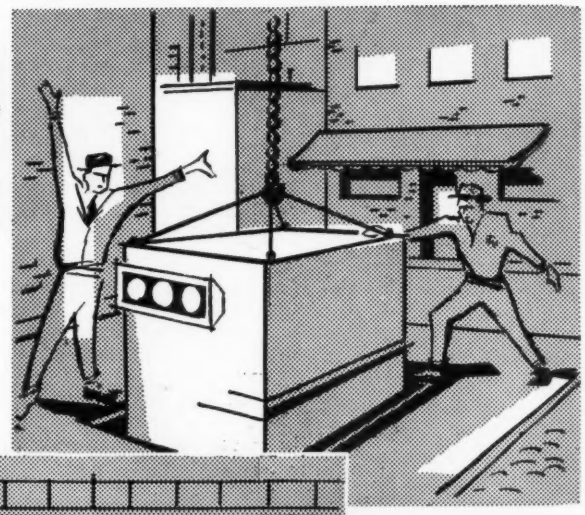
Send today for a list of equipment manufacturers supplying more reliable equipment insulated with Dow Corning Silicones. For network and station auxiliary transformers:

NETWORK TRANSFORMERS, bury them and forget them



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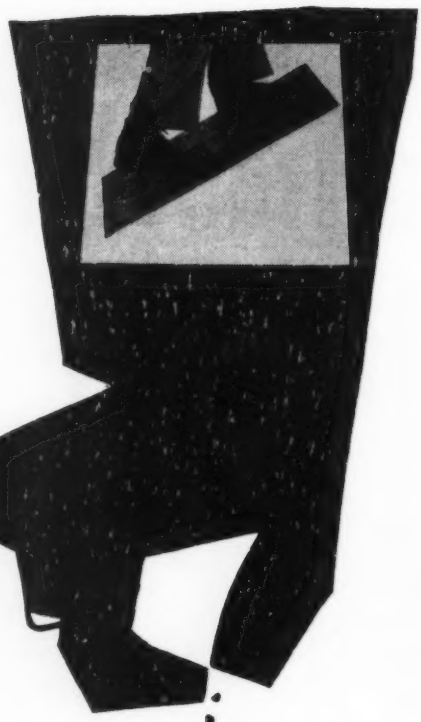

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You *could* do it... on Alcoa Abrasive Tread Plate!

Here's a surface with the grip and bite of a grindstone ... for it's made of the same aluminum oxide particles used in grindstones.

These abrasive particles are rolled right into aluminum — strong, light, rustproof, maintenance-free plate. It stays slip-proof even when wet, oily or greasy. Since the abrasive is rolled in, its slip-proof qualities are more than surface deep!

Use this safer abrasive tread plate wherever hazardous conditions exist. Your safety committee knows where they are.

Just remember that each year 20,000 workers are killed and thousands injured by falls due to slipping. Preventing just a single such accident in your plant makes Alcoa® Abrasive Tread Plate the best insurance you can buy!

Check the coupon for a four-inch sample, ask for complete details. Aluminum Company of America, 1670-J Alcoa Bldg., Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM ABRASIVE TREAD PLATE

THE ALCOA HOUR— Television's Finest Live Drama, Alternate Sunday Evenings

Aluminum Company of America
1670-J Alcoa Bldg., Pittsburgh 19, Pa.

Please send literature and four-inch sample of abrasive tread plate.

Name and Title.....
Company.....
Use Being Considered.....
Address.....
City and State.....

the length of the panels. Placed on the purlins, the panels are joined by slender T-shaped aluminum extrusions, one on each side. They are secured to each other by means of interior bolts. These bolts also connect beneath to steel clips which, in turn, are bolted to the purlins. A mastic seal makes all connections watertight. The system allows for wind movement, expansion, and contraction.

Another feature of the pavilion is its ceiling of metal mesh suspended below the cables of the bicycle-wheel roof. Diffused light from the plastic

THE U.S. PAVILION AT THE 1958 WORLDS FAIR IN BRUSSELS WILL HAVE TRANSLUCENT PLASTIC ROOF.

panels, supplemented by artificial light from above the mesh, will play on the ceiling giving it a continuous shimmering effect. Illumination also will be provided by a circular curtain wall of clear plastic attached to a self-supporting gold-colored metal grill.

Adjacent to the pavilion will be a theater seating approximately 1100 persons. Both pavilion and theater will be set in a 6½-acre site between the exhibits of the Vatican and the Soviet Union.

Texas Scores Another First

Air travelers will ride to and from their planes on a "moving sidewalk" at the new $7 million Love Field Airport, Dallas, Texas, scheduled to be opened to the public late in September.

Three moving sidewalk units totaling 1435 feet in length will carry passengers in both directions through the three corridors leading out from the main terminal building to the airplane loading gates. The operating speed at first will be 132 feet a minute, about half average walking speed and considerably faster than moving stairs. Passengers may walk while they ride and thereby increase their rate of travel. When the public becomes accustomed to the moving sidewalks, consideration will be given to increasing their speed.

The Dallas moving sidewalk is the first to be

MODERN STOKER-FIRED BOILERS

Despite the relatively wide extent to which oil – and gas – have come into use for firing industrial boilers, the fact remains that coal continues to be the most economical fuel available in many areas.

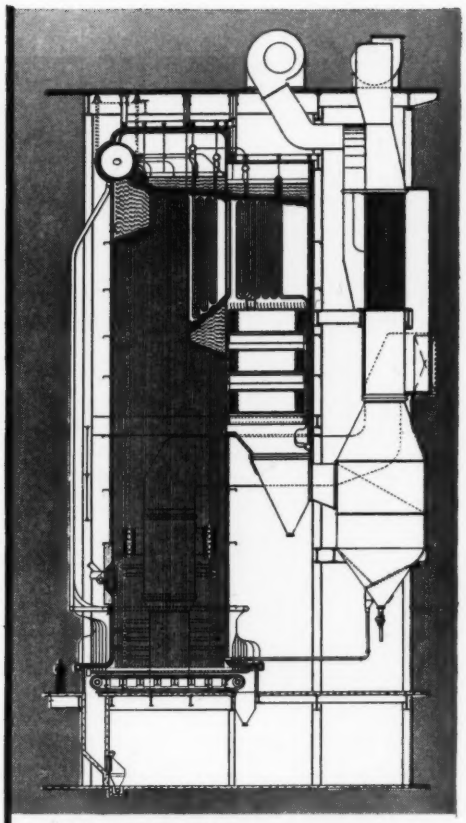
Moreover many potential coal users are unaware of the tremendous improvements that have been made in recent years in the design and general effectiveness of mechanical stokers. Here at Combustion virtually the entire stoker line has had extensive design changes, all directed at improved performance. But overall performance is tied in inescapably with boiler performance. At Combustion you have the important advantage of dealing with a leading boiler manufacturer that also offers the most complete line of stokers available anywhere. You are assured, therefore, of a completely coordinated design comprising stoker, boiler, furnace and – if desired – heat recovery equipment and/or auxiliaries, all engineered specifically for your particular requirements.

Displayed below are three – of the many – C-E stoker-fired boiler designs which, collectively, are suitable for any coal-firing conditions.

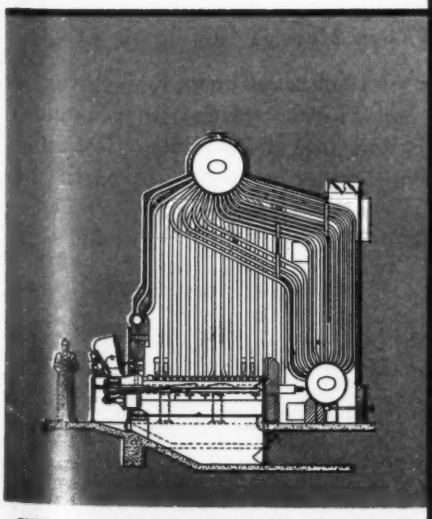
At the right is illustrated the latest – and largest – example of the C-E Bark-burning Unit, a design pioneered by Combustion and now widely used for burning bark, hogged-wood and other waste wood fuels.

So – when you are in the market for coal or other solid-fuel-burning units it will certainly be to your advantage to find out what Combustion Engineering has to offer. Our engineers will be glad to discuss your needs with you or your consultants.

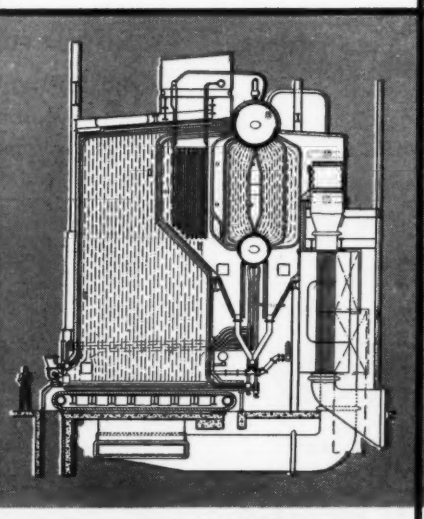
B-892A



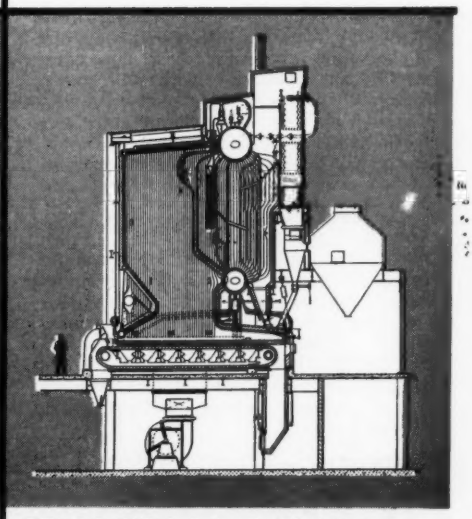
C-E BARK-BURNING UNIT for a paper company. This is a very large unit; capacity – 450,000 lb steam per hr, operating pressure – 1335 psig; total steam temperature – 958 F. It is designed to burn bark, natural gas, oil or any combination thereof. These units are in service for capacities as low as 20,000 lb of steam per hr.



THIS C-E VERTICAL-UNIT BOILER, TYPE VU-10 fired by a C-E Underfeed Stoker, Type E is for a dairy. Capacity is 30,000 lb steam per hr at 150 psig. VU-10 Boilers are available for capacities from 10,000 to 60,000 lb of steam per hr. They are often equipped with C-E Spreader Stokers, dump grate type.



ONE OF TWO DUPLICATE UNITS for a chemical company comprising C-E Vertical-Unit Boilers, Type VU-40 fired by C-E Spreader Stokers, continuous discharge type. These are baffleless boilers designed for a capacity of 150,000 lb steam per hr at 900 psig and 808 F. Coal is Eastern Bituminous.



THIS C-E UNIT is being installed for a soap company. It comprises a C-E Vertical-Unit Boiler, Type VU-50 fired by a C-E Traveling Grate Stoker. Coal used is Midwest Bituminous. This boiler is designed for a capacity of 100,000 lb steam per hr at 850 psig and 585 F. It is an outdoor type unit.

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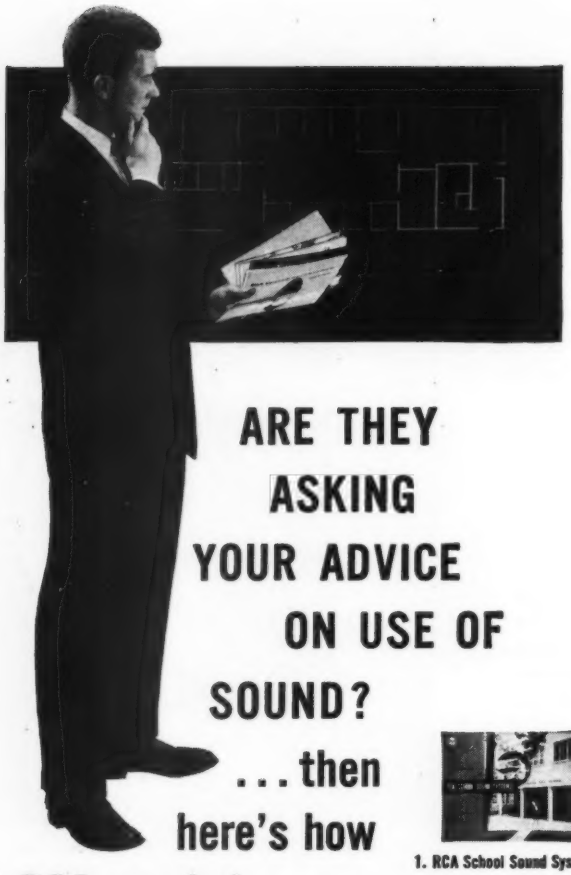
Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

CANADA: COMBUSTION ENGINEERING—SUPERHEATER LTD.



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installed at an airport. Manufactured by Hewitt-Robins, Inc., Stamford, Conn., the Glide-Ride will go around corners and may be installed in the form of a loop so that passengers are carried in two directions. The curving feature is not utilized at Dallas but will be used in other locations where the course is irregular rather than in a straight line.

Passengers stand on a rubber carpet fastened to individual 24- x 42-in. pallets linked together by universal couplings. The pallets are mounted on 4½-in. diameter rubber-tired wheels which run on a steel track. Three 30-hp electric motors, located in the basement under the terminal building, transmit power through lugs on a sprocket chain which engages the underside of each pallet. The rubber carpet does not pull any part of the load but is used only as a cover over the pallets to give passengers a smooth, even platform to ride on. It is made of solid rubber and contains no reinforcing fabric such as is used in conventional conveyor belts.

The shortest of the three Glide-Ride units measures 218 feet in each direction and is installed in the north corridor. The units in the east and west corridors are 250 feet long each way. All carpets are 42 inches wide, permitting pedestrians to ride two abreast. Corridors are completely enclosed and air conditioned. The moving sidewalks rise on a gentle grade from each end so that their center sections are about 8 feet higher than their ends. This provides an underpass to permit trucks and other service vehicles to drive under the corridors.

Two Boats in Every Garage?

Transformation of 1000 acres of mangrove swamp into the "Venice" of Florida was begun last month at New Smyrna Beach, one of Florida's oldest cities. An estimated 7 million cubic yards of earth will

LAYOUT OF VENEZIA, FLORIDA, A SUBURBAN CITY DESIGNED FOR YACHTSMEN. CLUB IS AT UPPER LEFT.

Are we ready to...*air condition* our school rooms?

which way comfort?

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Syncretizer Unit Ventilator

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Year'round Air Conditioners:

Syncretizer and *Mainliner* for classrooms

Roommate for offices

AudiCon for auditoriums

Thermovent Auditorium Ventilator

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Sill-line Radiation

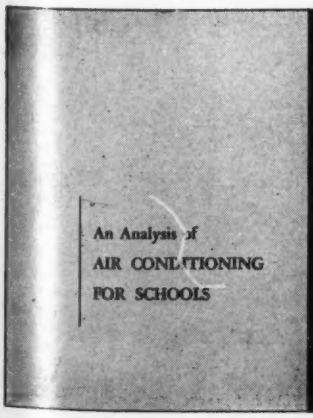
Are school boards ready? While many schools have not yet installed an adequate system of heating and cooling by controlled ventilation, many others find such protection indispensable—and even think of adding mechanical refrigeration for cooling at certain times of year. Needs vary in different parts of the country; but wherever school buildings are to be used all year round—and in areas where outside temperatures are often above 60° during the normal school term—a complete system of heating, ventilating, natural cooling, and air conditioning is the only assurance of a comfortable learning environment at all times. Therefore many school executives and board members are giving serious thought to air conditioning in tomorrow's schools.

Are taxpayers and bondholders ready? The people who supply the money for public education will have many questions about the cost of installing and operating year-round air conditioning, but the facts will be weighed against the benefits to students and community.

Are architects and engineers ready? Is contemporary school building design well suited to the employment of summer air conditioning? What effect upon design will the growing desire for year-round comfort protection have? How best design the system—for installation all at once or in successive stages?

IS NESBITT READY? With more than a quarter-century of experience in the manufacture of air conditioning components, Nesbitt is prepared to offer its Year'round Air Conditioners (*Syncretizer* and *Mainliner* for classrooms; *Roommate* for offices; and *AudiCon* for auditoriums). All Nesbitt Year'round units may be installed initially for heating and cooling by controlled ventilation, and the summer cooling components may be added later.

Are you ready? Whatever your relation to the school field, you probably have questions: What is involved in air conditioning a school? What are the initial and the operating costs? What must be considered before deciding to install controlled ventilation now and mechanical refrigeration later? These and many other questions are answered in the treatise by Nesbitt engineers, "An Analysis of Air Conditioning for Schools." Mail this coupon for your free copy.



this free publication will answer many of your questions

JOHN J. NESBITT, INC., DEPT. G
PHILADELPHIA 36, PA.

Gentlemen: Please send me a copy of your publication, "An Analysis of Air Conditioning for Schools."

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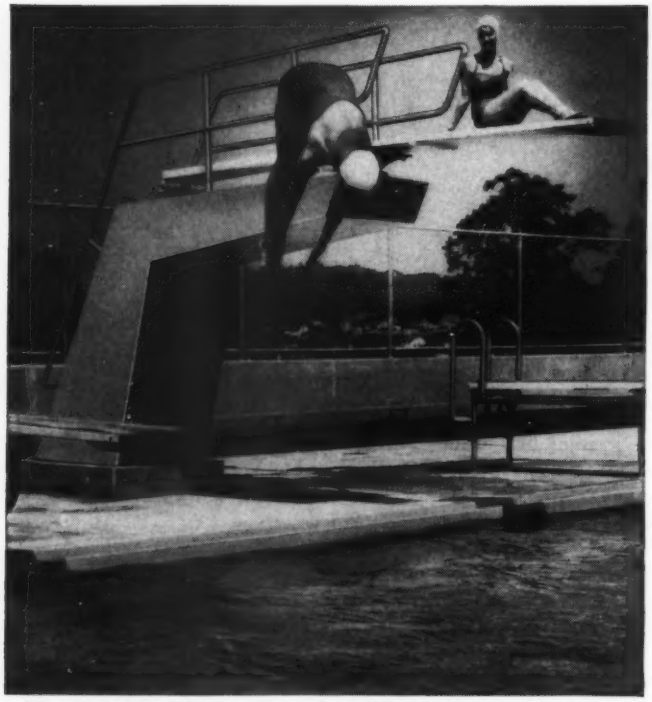
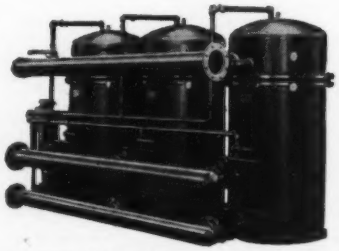


The 621,000 gallons of water in the Mack Community Center swimming pool at Indiana, Pa., can be filtered three times a day — another example of how high capacity Adams filters protect the health of swimmers across the nation.

Here's why the finest pools have R. P. ADAMS SPF filtration!

When you specify Adams filtration for your client's pool, you get a complete package . . . there's no divided responsibility for performance. Then, the entire system is designed for ease of operation and maintenance. What's more, you get the most advanced filter design offered — using diatomaceous filter aid and permanent Poro-Stone elements. Write for the full details today.

R. P. Adams filters are used to maintain the shimmering clarity of the new Y. W. C. A. pool in Buffalo, New York.



Adams SPF filters are ideal for community pools like that illustrated above. This triple SPF 169 can handle pools up to 730,000 gallons capacity.

R. P. ADAMS CO., Inc.

256 East Park Drive, Buffalo 17, N. Y.

be moved with a hydraulic dredge to reclaim an area that was formerly owned by the city and the State of Florida.

Known as Venezia, the development will be divided into 1200 home sites, each with a 100-ft frontage on a deep waterway. A stem canal, approximately down the center of the area, and terminating with a yacht club, will have wide canals extending from it in both north and south directions.

Smaller canals will lead off the main north and south canals, served by streets that connect with the main highway artery encircling the community. The system of canals will make it possible for residents to do their shopping, take children to school, or visit friends by boat.

The development was planned by Arthur McVoy, city planner of Baltimore, Md.

Primary excavating is being done with a ten-inch hydraulic pipeline dredge designed and built by the Ellicott Machine Corp., of Baltimore.

Economical Structural Member Developed for Long Span Roofs

Stability tests have been concluded on a structural model of a special type of long span roof supporting member that combines the arch and suspension system.

Basic idea of the spans has been advocated for several years by Paul Chelazzi, well-known Italian engineer-architect.

The model shown represents a single span structure consisting of an upwardly curving arch member and a downwardly curving cable member—connected at the ends and also connected at intervals by struts of various lengths. In principle, the structure is similar to the conventional tied arch except that the lower cable is depressed instead of being straight. It contains no diagonal bracing members.

Engineers at John A. Roebling's Sons Corp., where the tests were conducted, said the new structural

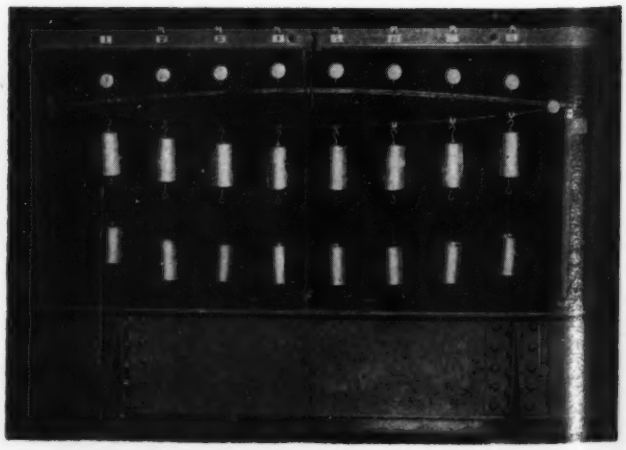
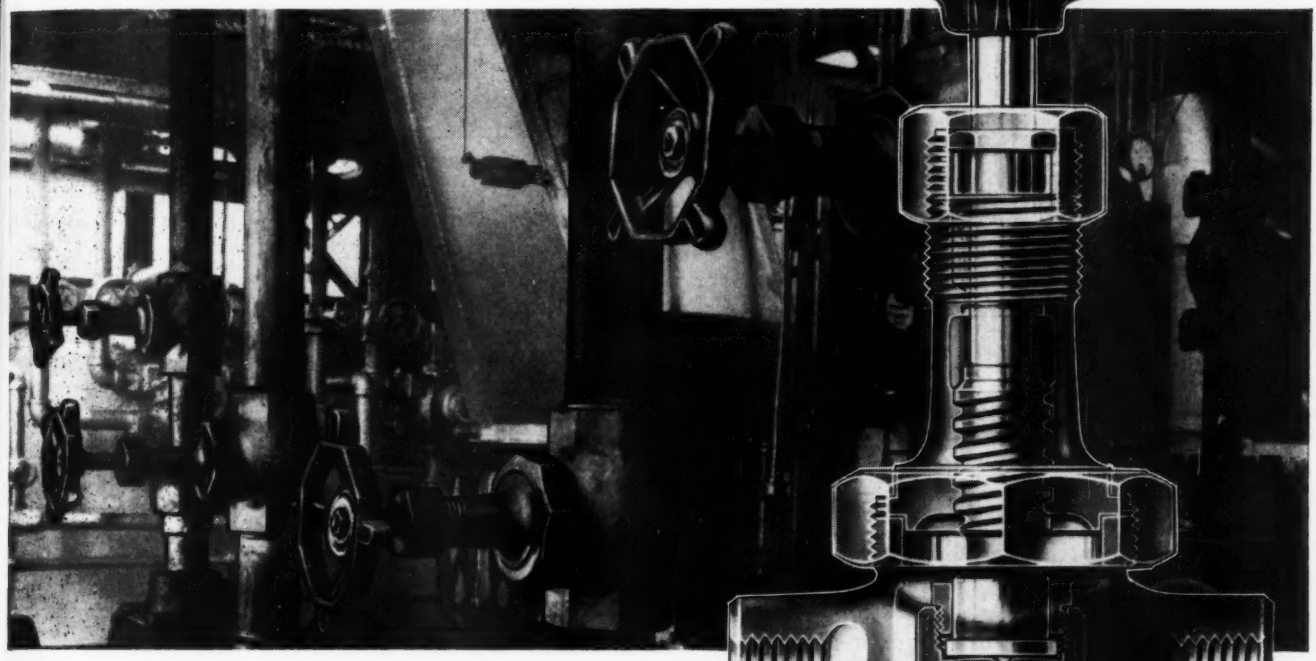
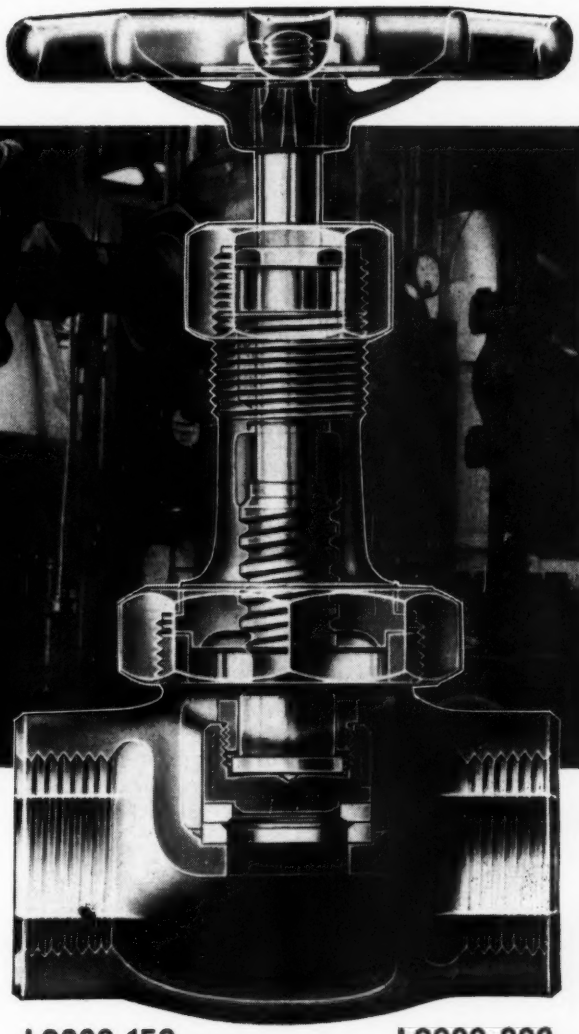


PHOTO SHOWS METHOD USED TO TEST STABILITY OF SINGLE SPAN STRUCTURE WITH CURVED MEMBERS.

You Can't Find the Cost of a Valve on a Price List





With today's high maintenance expense, the cost of keeping a troublesome valve in repair can dwarf its original price in a few months' time. The minute a maintenance man touches a wrench to a valve, its cost is often doubled. That's why the purchasing trend is to *top quality* —the longest-lasting, most dependable industrial equipment on the market. And in the valve field, that means Lunkenheimer . . . famous for quality and maintenance-free service since 1862. The Lunkenheimer Company, Box 360 Annex Station, Cincinnati 14, Ohio.

LQ600-150
150 lb. S. P.
300 lb. W. O. G.

LQ600-200
200 lb. S. P.
400 lb. W. O. G. 550°F.

¼ to 2 inches

The cost of a Lunkenheimer Valve gets smaller...and smaller...and smaller... with each passing year of dependable service

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24 years . . .
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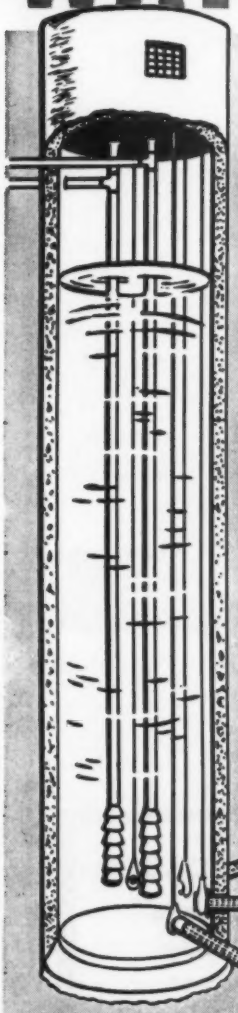

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member is feasible and economical for use in hangars, arenas, auditoriums, stadiums, terminals, gymnasiums, warehouses, industrial plants, and theaters.

New Jersey Moves To Alleviate Water Shortage

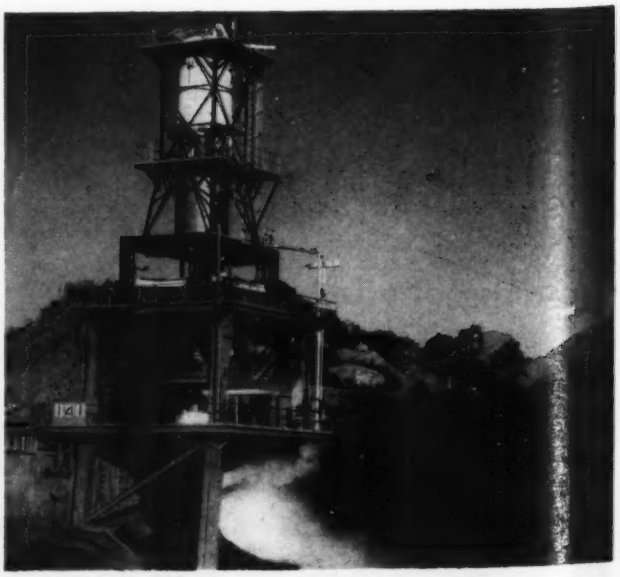
Acute water needs of the northeastern section of New Jersey can best be provided by using the Raritan River basin, according to a preliminary report to the State Water Resources Advisory Committee from Whitman, Requardt & Associates, of Baltimore. The report said that the basin is the only area where large additional water quantities can be obtained immediately and economically for the northeastern metropolitan counties.

Last year funds were provided for the State to acquire the Round Valley area in Hunterdon County for a reservoir, using water from the Delaware River only. A bill is now pending to permit use of Raritan River water also.

The second phase of the Water Resources Committee's effort to develop a practical, business-like solution to the State's water supply problem will be a long-range, comprehensive study of New Jersey's underground water resources. The New York hydrological engineering firm of Leggette, Brashears & Graham is undertaking this study, the first of its scope to be attempted in the State.

Rocket Test Stand Installation Completed

Daniel, Mann, Johnson and Mendenhall, Los Angeles engineers and architects, developed plans and supervised construction for the Santa Susana Hot Test Acceptance Facility for North American Avia-



ENGINES ARE ANCHORED IN STEEL AND CONCRETE TEST STANDS WHERE THEY ARE STATIC TESTED.

The Boiler they threw the book at

You know exactly what a Continental Automatic Boiler will do, even while it's still in our factory. That's because we test and re-test it, at every stage in its manufacture, then fire-test it before shipment for a final performance-proof of its guaranteed efficiency of more than 80%.

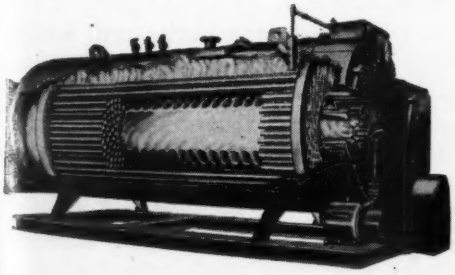
With a Continental, guesswork is out. You specify the right size for the job, not an oversized boiler just to play it safe. And each boiler-burner unit is rated on its own test-floor performance, not its square feet of heating surface.

Continental efficiency stays almost constant over a wide load range and a long service life. When plant expansion requires greater steam production, it's easy to add another performance-proved, fire-tested Continental Automatic Boiler — the boiler with the exclusive "Spinning Gas" feature. For details, send for Bulletin BE-3.

BOILER ENGINEERING & SUPPLY COMPANY, INC.

1 Manavon Street, Phoenixville, Pa.

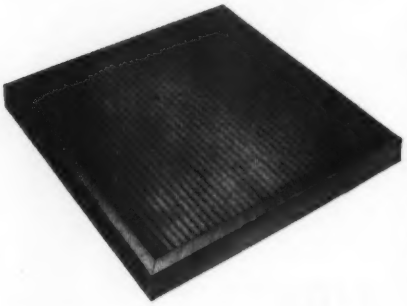
The Continental AUTOMATIC BOILER



(Left) Series F Continental Automatic Boiler, with modulating control. Other models from 20 to 500 hp, with on-off, low-high-low or modulating controls, burn oil and/or gas. For steam heating or process work at pressures from 15 to 250 pounds, or for hot water heating at low or high temperatures.

A HALF CENTURY OF BOILER MANUFACTURING EXPERIENCE

NEW DRY-TYPE WASHABLE AIR FILTER



A new air filter by Air-Maze combines the efficiency of a dry, oilless, completely washable panel with a greatly extended filtering surface for longer service life. Has over 8 times the effective surface area of a conventional panel. Especially efficient in removing lint from recirculated air, and for applications where oil vapors cannot be tolerated.

Special screen grids on both sides of filter permit lint to be brushed off several times before washing is necessary. Filter offers complete washability in cold water. May also be cleaned with a vacuum nozzle.

Made of corrosive-resistant materials—aluminum screen and polystyrene-bonded fiber glass media in galvanized channel.

Available in 2" thick panels—16" x 20", 16" x 25", 20" x 20", and 20" x 25" sizes. Write for Bulletin P70P, **AIR-MAZE CORPORATION**, Cleveland 28, Ohio.

Automatic
In-Transit Weighing by MERRICK!

FEEDOWEIGHT* CONTINUOUS GRAVIMETRIC WEIGHT FEEDER

Automatic continuous constant weight feeder. Ideal for blending, proportioning and feeding of granular materials to process by weight.

Extensively used for ball and rod mill feeding. Widely accepted as the proper medium to accurately blend basic cement components such as clinker, gypsum, etc. Ruggedly constructed for long-life, trouble-free operation.

*Reg. U. S. Pat. Off. Bulletin 253 on request

MERRICK SCALE MFG. CO.
PASSIAC NEW JERSEY

tion, Inc. The cost of this rocket test facility was in excess of $11 million, including test stands, laboratories, cafeterias, roads, garages, security systems, fire protection, offices, and machine shops. The static test stands of steel and concrete had to be designed to withstand not only more than one million pounds of thrust developed by the rocket engines, which will power guided missiles for Air Force, Army, and Navy, but also to provide a means of rapidly dissipating the intense heat. Test stand installation includes block houses and terminal stations with attendant instrumentation, liquid oxygen tanks and lines, piping systems metering devices, valves, and heat exchangers. Details regarding this installation are, of course, restricted information.

Spokane To Build Toll Bridge

Tudor Engineering Co., San Francisco, Calif., is the consulting engineer for the City of Spokane, Wash., in the design of the Spokane River Toll Bridge, scheduled to be open for traffic in 1958. The substructure will be completed this summer with steel erection starting in the fall.

The bridge will extend from Maple Street on the north side of the Spokane River to Walnut Street on the south side. It is located immediately west of the central business district.

At the point where the bridge crosses the Spokane River, the stream is only about 250 feet wide at normal flow, but it has eroded a valley from 100 to 140 feet deep and 1800 feet wide with steep banks on both sides. The topography is favorable in that the high banks permit the roadway to pass beneath the railroads and streets at the bridgeheads, thus eliminating grade crossing at these points. At the north end of the bridge, the approach is carried under the main lines of the Great Northern and Union Pacific railroads and under the principal cross streets before reaching the surface.

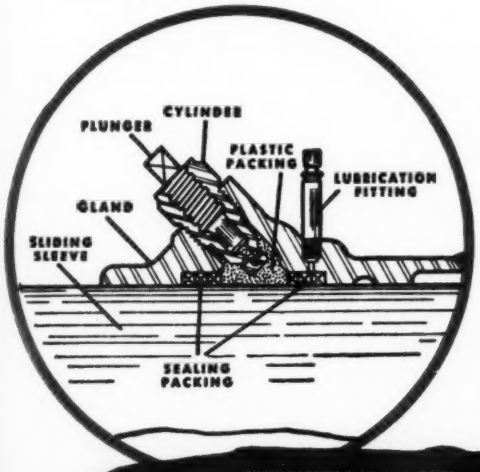
The bridge is of deck steel plate girder construction. Four 150-ft main spans cross the river and lower valley. To the south of these spans will be ten spans varying in length from 92 to 151 feet, giving a total length for the main crossing of 1713 feet. As a part of the main crossing, there will be an on-ramp at the south end of the bridge composed of five 75-ft rolled beam spans. Two reinforced street underpasses are to be located at the south approach and two more at the north approach. Railroad underpasses at the north approach will be of steel beam and concrete construction.

Roadway width between curbs will be 50 feet, providing for four 12-ft lanes and a 2-ft raised median strip. A 5-ft sidewalk will be provided on the downstream side. The bridge has been designed for H20-S16-44 vehicular loading defined by the 1953 specifications of the American Association of State Highway Officials.

Contracts have been awarded for substructure, superstructure, electrical, and north and south approaches. Bids will soon be received on the toll col-

new savings
for expansion joint users

Cross-section of Gun-Pakt feature. To add packing, just add a plug and turn the plunger.



The Yarway Type W Gun-Pakt Expansion Joint has an improved one-piece design of body and gland and improved method of packing that provide new maintenance economies and greater operating efficiency.

Bolted joint between body and gland is eliminated; the steel body includes gland and guide. Shorter face-to-face dimensions are possible. Improved angle of packing guns makes them more accessible and *permits injection of the special plastic packing directly into packing space.*

The famous Yarway *Gun-Pakt* feature permits *addition of packing under full steam pressure. No need for costly shutdowns to repack.*

Sizes 1½" to 30", pressures 150, 300, 400 psi. Single or double types, flanged or welding ends.

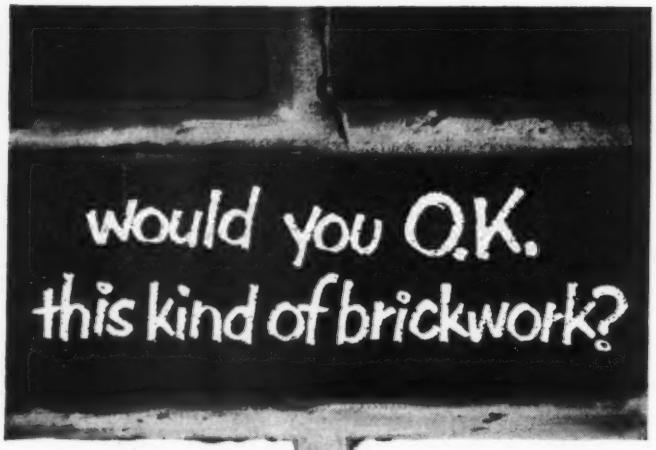
For full description, write for new Yarway Bulletin EJ-1916.

20" Yarway Type W Gun-Pakt Joint with base, single type, welding ends, 8 guns.

YARNALL-WARING COMPANY
106 Mermaid Avenue
Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY GUN-PAKT

...a good way to specify expansion joints



Obviously not. The mortar's shrinkage has left cracks that permit water penetration, resulting in leaks and efflorescence.

To prevent conditions like these . . . use Horn's Hydratite® PLUS. It retains the mixing water in the mortar, reduces absorption by bricks. This allows the mortar to develop full strength, adhesion and bond to masonry. The results? You control shrinkage, prevent leaks and efflorescence.

To make concrete, stucco or cement plaster mixes water repellent . . . use Horn Hydratite in liquid or powder form.

Like to know more about the Hydratites? For condensed data see Sweets—for complete A.I.A. specifications, write Dept. H55-9100.

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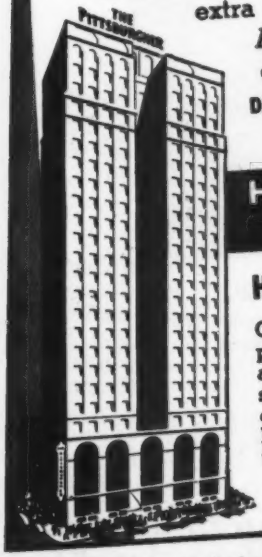

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KNOTT HOTELS

lection equipment and on the administration building. Architects are Blanchard and Maher of San Francisco. Supervision of construction is under direction of the Washington Department of Highways.

Tri-Dam Project Dedicated

California's Tri-Dam Project was formally dedicated recently. The three dams — the Donnells, Beardsley, and Tulloch — will increase water storage on the middle fork of the Stanislaus River by 230,400 acre feet and provide 81,000 kw of electric power to Pacific Gas and Electric Co. The project is a joint venture of the Oakdale Irrigation District and the South San Joaquin Irrigation District. Of the three dams, only Tulloch Dam is still under construction. The agreement between the irrigation districts and PG & E made it possible for the districts to obtain financing for the construction of the dams without difficulty.

Engineering design for Donnells powerhouse, Beardsley Dam and powerhouse, and Tulloch Dam and powerhouse, was handled by the International Engineering Co. Engineering design for Donnells Dam and Tullock afterbay was handled by George E. Goodall Co. Tudor-Goodenough Engineers co-ordinated and supervised all engineering.

The Donnells powerhouse, largest power producer of the three dams, will store 64,500-acre feet of water. It is equipped with the largest vertical impulse type hydraulic turbine in the U.S., an Allis-Chalmers six-jet turbine that develops 74,500 hp under a 1151-ft head. The turbine is direct-connected to a 67,500-kva, 80 percent pf, 13,800-v Allis-Chalmers generator operating at 240 rpm to produce 54,000 kw.

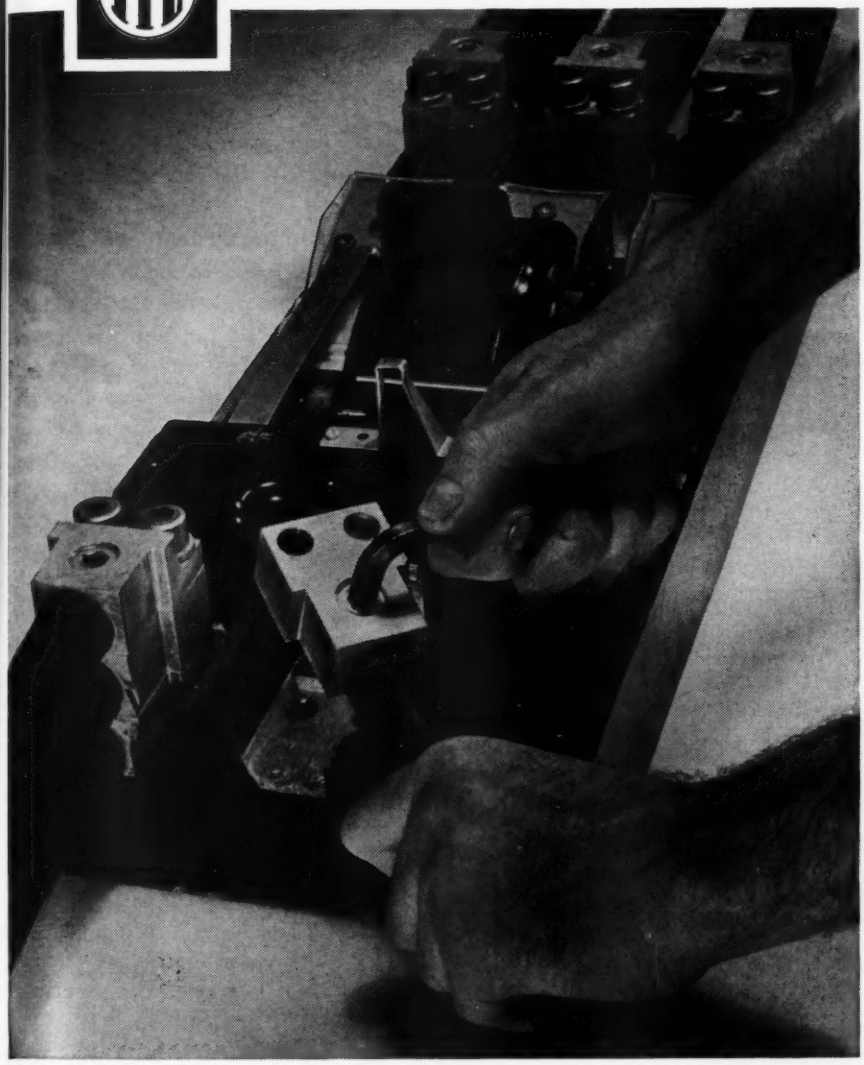
The Tulloch Dam power generating equipment, furnished by S. Morgan Smith and Westinghouse, will consist of two 12,000-hp, 153-ft head Francis type hydraulic turbines direct connected to 240-rpm generators to provide 17,000 kw.

Control center for the three dams is the centrally located Beardsley powerhouse equipped with an Allis-Chalmers 14,000-hp Francis type hydraulic turbine operating under 258-ft head direct connected to an 11,100-kva, 9990-kw, 9 percent pf, 6900-v generator operating at 300 rpm.

Massachusetts Law Permits Engineering Practice by Corporations

Massachusetts now can be added to the 1957 roster of states that passed laws affecting corporate practice. The new Massachusetts law stresses that nothing in the state laws can be construed to prevent or to affect "the engagement in engineering or land surveying . . . by a firm, co-partnership, corporation, or joint stock association provided that the person or persons in responsible charge . . . are professional engineers or land surveyors . . ."

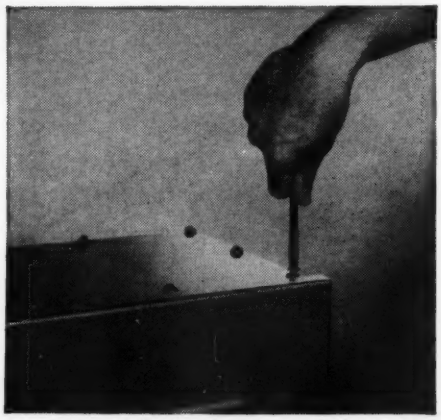
MOLDED CASE CIRCUIT BREAKERS



These individual cable lugs, each with an Allen head locking bolt, make connection of cables far easier and provide a much sturdier, neater assembly. An exclusive on all I-T-E 800 ampere breakers. UL approved for service entrance equipment.

I-T-E enclosures are side-hinged—no need to remove, or prop up, the cover. It is nevertheless easily removed, the hinge being of the pin-and-socket type—lifts off and on readily.

Field checks indicated that the addition of a supporting bracket would be a big help in installing larger breakers, and this feature is now added on all large-size enclosures.



To facilitate drilling holes of the desired size and position, end-plates of larger enclosures can be unscrewed and removed. Drill to your exact conduit needs.

SEVERAL EXCLUSIVE I-T-E FEATURES COMBINE TO SAVE YOU MONEY WHEN INSTALLING CIRCUIT BREAKER EQUIPMENT

In designing molded case circuit breakers for higher capacities, for example, I-T-E design engineers recognized that the difficulties inherent in making large multiple cable connections had to be considered. Pictured above is their solution—"stacked" lugs for time-saving installation. No need to fight clumsy, unyielding cables.

I-T-E enclosures, too, have exclusive, built-in features which greatly facilitate installation of circuit breaker equipment —saving additional installation time. And since time is certainly money these days, consider the time-saving features pictured here and you'll see how I-T-E can save you money even before your I-T-E breakers are in service!

I-T-E CIRCUIT BREAKER COMPANY • **Small Air Circuit Breaker Division**

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Splash Proof Moisture Tight Semi-Dust Tight

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WEATHER RESISTANT·

CONTROLS

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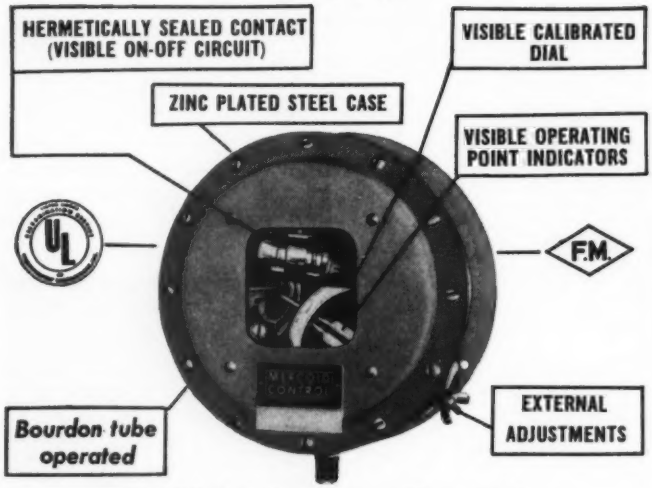

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WRITE FOR BULLETIN 6-18

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Interior Fire Protection involves more than most people see . . .

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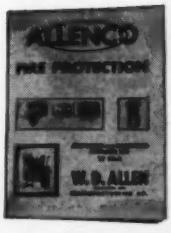
Flush-type Siamese—one of many models

This time-proved line more than meets specifications. It meets the highest standards of safety plus design, practicality and economy.



Write for Allen 150 (A.I.A. file 29e2) and nearby counsel . . .

W. D. ALLEN MFG. CO.

Room 700 Allenco Bldg. 566 W. Lake St. Chicago 6

Amherst, N.Y., Building To Be Heated by Heat Pump

The new research and development center of Sylvania Electric Products, Inc., at Amherst, N.Y., will be heated and cooled by an air source heat pump with no auxiliary conventional heating system. This is the first building this far north planned for such an installation.

The York Corp. heat pump system, which is located in an equipment room adjacent to the building, has a capacity of 250 tons of cooling in summer and 2,400,000 Btu per hour for winter heating. It consists of two systems, each made up of one 125-hp high stage 16-cylinder V/W compressor and one 75-hp low stage 16-cylinder V/W compressor; two air cooler-condensers and one 22-in. by 12-ft water cooler-heater. Hot or cold water is circulated to the air conditioning units by two 25-hp pumps.

Inside summer design is 78 F dry bulb and 50 percent relative humidity and 70 F dry bulb in winter, with outside design at −5 F dry bulb in winter and 93 F dry bulb and 75 F wet bulb in summer.

A Minneapolis-Honeywell Supervisory DataCenter and control system will automatically change the system from heating to cooling and vice-versa, depending on the outside air temperature and the interior building requirements. Fan coil units installed around the periphery of the building will be individually controlled automatically, while zone thermostats will control the interior area air systems. Two built-up air units of about 35,000 cfm, in a penthouse on the building's roof, supply air to the conditioned spaces through conventional low pressure ductwork with diffusers.

Architect and engineer for the building is J. Fruchtbaum, of Buffalo, N.Y.

ACI Committee Organizes Southern California Chapter

A committee of 23 men, representing a cross-section of engineers, builders, producers, and users of concrete, concrete materials, and concrete products, has been at work organizing the first official local or regional unit to be formed within the American Concrete Institute. The new chapter will serve the southern California area, to the north boundries of San Luis Obispo, Kings, Tulare, and Inyo Counties.

Structural and consulting engineers in private practice on the committee include: Henry M. Layne, committee chairman; S. B. Barnes; Sam Hobb; F. Thomas Collins; J. L. Peterson; William T. Wheeler; and William T. Wright.

Among the objectives of the chapter is organization of means to carry on advisory work with other groups and agencies for correlation of code requirements, standardization of building regulations, and explanation and use of ACI Building Code and

standards of practice, with the object of improvement of design and construction.

The group also plans to follow and assist in the sound development of new methods and techniques and to encourage selected research projects to develop test data and techniques useful to designers and builders of concrete construction, to producers, and to the public.

Progress Made By Washington Consulting Engineers

Consulting engineers in the State of Washington are to take a more active part in the expanded highway program. The State Highway Director has promised to let out much of the structural work to private consultants in connection with the freeway to be built from Tacoma to Everett through Seattle.

The Consulting Engineers Association of Washington is planning to prepare a brochure for distribution to industries, similar to the one prepared by the California Association, in the fight against "free" engineering. Certain firms in the area are furnishing not only engineering on their own equipment, such as boilers, but also offer to design the buildings and appurtenances "free."

The following directors elected at the annual meeting of the Washington Association, in May, took office on July 1, 1957: H. W. Kramer, Carey and Kramer; H. T. Griffith, Bouillon and Griffith; W. O. Stevens, W. O. Stevens and Co.; C. M. Barr, Marshall, Barr and Associates; W. Enkeboll, Dames and Moore, Seattle; A. E. Hill, Hill and Ingman, Seattle; and H. J. Whitacre, Horace J. Whitacre and Associates, Tacoma.

Arkansas Holds Promise For Chemical Industry

A prediction that the chemical industry would be attracted to Arkansas because of the state's "enormous resources of water" was made by Dr. R. S. Aries, of Aries and Associates, New York consultants, in a report submitted to the Arkansas Industrial Development Commission. The report was the third in a series requested by the Commission on basic industries.

Dr. Aries said the chemical processing industry was expected to double in the next seven years, and the expansion would have to be in places where water is plentiful.

The boom in chemicals will be accompanied by expansion of allied industries such as pulp production. He also said that the consumption of charcoal, now primarily used for domestic outdoor barbecuing, is increasing at the rate of 4 percent a year and that its production would be an ideal industry for Arkansas because it utilizes waste wood, equipment cost is low, and demand is expected to continue firm. Synthetic textile production also was suggested as a major potential industry. ▲▲

NEW

THE 1957

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by FAIRBANKS-MORSE

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Here is your up-to-date, authoritative source of data to assist you in solving your pump application problems. 251 pages with tables, graphs, formulas. Expertly edited, fully illustrated. Order now—limited distribution.

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Interior Fire Protection involves more than most people see . . .

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Flush-type Siamese—one of many models

This time-proved line more than meets specifications. It meets the highest standards of safety plus design, practicality and economy.

Write for Allen 150 (A.I.A. file 29e2) and nearby counsel . . .

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Men in Engineering

New president of the National Society of Professional Engineers is Garvin H. Dyer, director of the Missouri Water Co. and manager and chief engineer of the Independence Division of the firm. He succeeds Robert J. Rhinehart of Pine Bluff, Ark.

New vice presidents are: A. H. Kidder, Northeastern Region; John B. McGaughy, Southeastern Region; Harry G. Kennedy, Central Region; W. L. Hindermann, North Central Region; Clark A. Dunn, Southwestern Region; and L. R. Durkee, Western Region. Russell B. Allen, College Park, Md., was elected for his tenth term as treasurer.

Ib Falk Jorgensen, Consulting Engineer, has moved to new offices at 1240 West Bayaud Avenue, Denver, Colo.

The newly created North Eastern District of the American Institute of Electrical Engineers will be headed by Sven O. Osthagen as vice president. Osthagen is manager of the Providence, R. I., office of Allis-Chalmers Mfg. Co.

The new division, known as District 12, includes Maine, Massachusetts, New Hampshire, Vermont, Rhode Island, and Connecticut. The board of directors has realigned District 1, re-naming it the Empire District. It now includes up-state New York. Prior to the creation of District 12, New York State and New England states were in District 1.

Jas. Gamble Rogers, II has announced affiliation of the following members of his present staff as associates in the newly formed architect-engineer firm of Jas. Gamble Rogers, Lovelock and Fritz: Laurance W. Hitt, Ralph P. Lovelock, Irwin W. Fritz, James A. Grinnan, and Herbert L. Clark. Offices are located at 145 Lincoln Ave., Winter Park, Fla.

Russell T. Branch, chairman of the board of Stone & Webster Engineering Corp., Boston, Mass., will retire after 45 years with the firm. He has been chairman since May 1955.

BRANCH

WEIR

Paul Weir, chairman of the board of Paul Weir Co., Inc., Chicago, Ill., has been elected to honorary membership in England's Institution of Mining Engineers. Weir is one of only four Americans in recent years to win election to the Institution.

Secretary of Defense, Charles E. Wilson, will be National Chairman of the Alumni Division in Carnegie Institute of Technology's $24,350,000 Building and Development Program. Wilson is a 1909 electrical engineering grad of Carnegie. Co-chairmen of the development program are Benjamin F. Fairless, American Iron and Steel Institute, and Gwilym A. Price, Westinghouse Electric.

The Houston Engineers Club, Houston, Texas, has changed its name to Houston Engineering and Scientific Society.

Burgess H. Jennings has been appointed director of research for the American Society of Heating and Air-Conditioning Engineers. He will direct operations of the Society research program both at the ASHAE research laboratory in Cleveland and at cooperating institutions. Since 1942 Professor Jennings has been chairman of the department of mechanical engineering, Technological Institute, Northwestern University.

At Ebasco Services, Inc., consulting civil engineer A. T. Larned is a member of the arrangements committee now making plans for the 1958 Congress on Large Dams, a meeting of engineers from all over the world, to be held in New York in the fall of 1958. Associate consulting engineer A. C. Clogher is a member of the fund raising committee for the meeting.

In the engineering department, E. C. Yaw was named assistant chief mechanical engineer; G. E. Lafaye, architectural supervisor; F. J. Alexandro and C. J. Danowitz, mechanical supervisors; and A. H. Burkhalter, L. G. Parks, G. M. Heckel, A. M. Schlick, E. W. Whitmer, electrical supervisors.

H. A. Stepleton & Co., Toledo, Ohio, have changed the name of their firm to H. A. Stepleton & Associates, Consulting Engineers. Offices are at 4528 Monroe St.

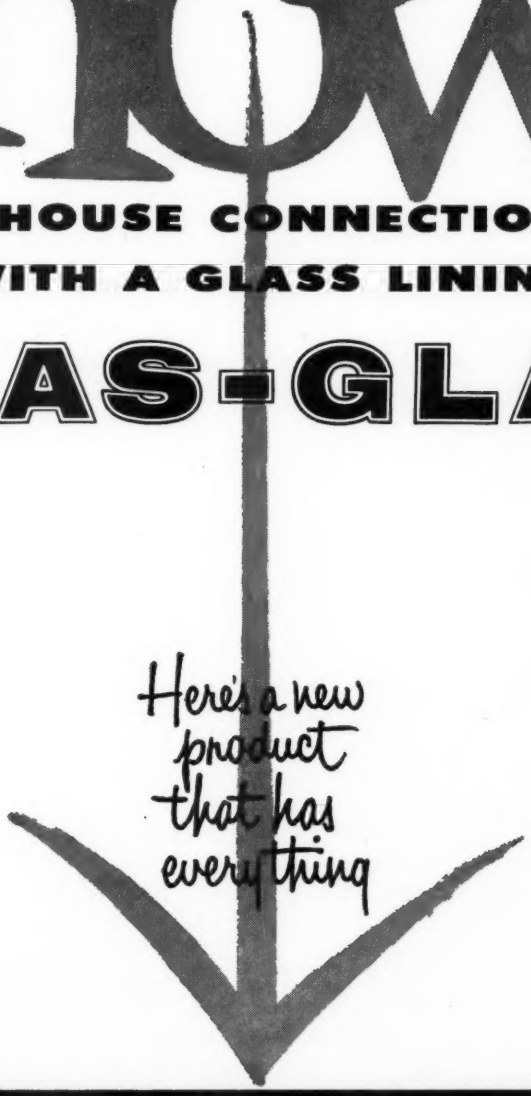
W. H. Corddry has been elected president of Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, Pa., succeeding Farley Gannett who became chairman of the board of directors. S. W. Fleming, Jr. was named vice chairman of the board and treasurer of the corporation, and J. D. Carpenter became senior vice president and secretary.

The company has also announced formation of an associated partnership to handle various

now

A CLAY HOUSE CONNECTION PIPE WITH A GLASS LINING

GLAS-GLAZ



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THE ROOT PROOF AMVIT JOINT

GLASS LINED INSIDE AND OUT

ALL COMBINED TO MAKE AN OUTSTANDING HOUSE-TO-STREET SEWER FOR MODERN HOME REQUIREMENTS

To meet the pressing need for a house connection pipe which could stand up under years of hard service, American Vitrified has developed a new way of glazing vitrified clay pipe. In place of the conventional salt glaze, Amvit Glas-Glaz pipe is lined inside and out with a glass-like ceramic material. This pipe with glass lining is smoother, stronger, more acid resistant and together with the Amvit Joint, root proof, tighter and timeless.

To protect the health and welfare of your community, specify Glas-Glaz, the glass lined clay pipe. You'll be sure the house connections are as strong and tight as the city sewer system. And Glas-Glaz never wears out.

Write or call us for more information — AMERICAN VITRIFIED PRODUCTS CO., National City Bank Bldg., Cleveland 14, Ohio

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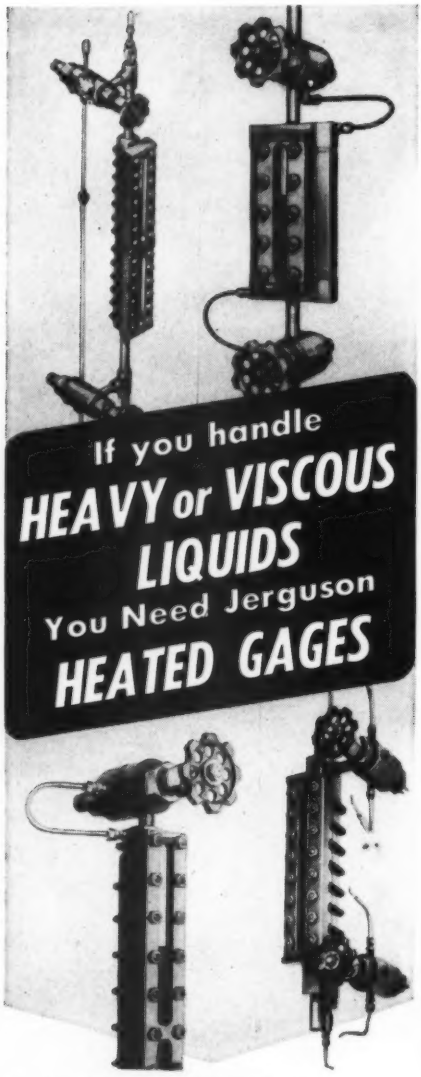
CLEVELAND, OHIO



In the COMPLETE LINE of Jerguson Heated Gages there is a model to meet your specific needs . . . heated by steam or electrically

You can accurately gage heavy or viscous liquids with Jerguson Heated Gages . . . and the line is so complete there is a model to meet your specific problem. Made in Reflex or Transparent styles, in External or Internal Tube models, as well as a large chamber model with dual tubes. Heated by steam, hot fluid, or electrically. Furnished with special jacketed heated-gage valves, union or non-union connections. You get accurate, dependable gaging of heavy or viscous liquids, or protection for cold weather installations.

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Gages and Valves for the Observation of Liquids and Levels

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100 Adams Street, Burlington, Mass.
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Jerguson Tress Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

consulting engineering assignments. Partners are W. H. Corddry, J. D. Carpenter, J. R. Dietz, and R. W. Foster.

Robert J. Carter, district manager of Stone & Webster, has been named a special assistant to the managing director of E. B. Badger & Sons Limited of London, a subsidiary of S&W in Great Britain.

Holmes & Narver, Inc., Los Angeles, Calif., have named Russell Field, Wylie F. Nance, and David L. Narver, Jr. as assistant vice presidents.

Richard G. Rowe has opened an office for practice of chemical engineering at Redding Ridge, Conn.

Soils specialist Fernando J. Tomassoni has joined the staff of Rader and Associates, Miami, Fla.

Bruce Buchanan has been elected vice president—reports and appraisals of the J. G. White Engineering Corp., succeeding Walter Carr, who retired recently.

Southern Indiana Engineering Co., Inc., Columbus, has moved to new larger offices at 15½ Brown Street. Expanded facilities and added personnel now enable them to offer engineering consultation and design service in water supply, sewage treatment, foundation testing, structural, mechanical, electrical, public buildings, subdivision, and land surveying.

The American Society of Civil Engineers has bestowed its highest honor — Honorary Membership — on two Americans, a German, and a Mexican. They are Professor Whitney Clark Huntington, head of the Department of Civil Engineering, University of Illinois; Howard Scott Morse, chairman of the board, Indianapolis Water Co.; Dr. Karl Imhoff, of Essen, Germany; and Lorenzo Perez Castro, Mexico City. Castro is consulting engineer on railroads for the Mexican Government's financing agency, Nacional Financiers.

Roger H. Gilman, director of port development for the Port of New York Authority, has been elected president of the Metropolitan New York Section of the American Society of Civil Engineers. Michael N. Salgo, principal assistant to the district civil engineer, Third Naval District Headquarters, has been named vice president.

Gershon Meckler, formerly associate and chief mechanical engineer at Samborn, Steketee and Associates, Toledo, Ohio, has formed his own consulting firm under the name of Meckler Engineering Co. With offices at 713 Phillips Ave., Toledo, the new firm will specialize in mechanical services related to buildings, process air conditioning, refrigeration, heat transfer, piping, and boiler plant design.

MECKLER MANDIGO

James A. Mandigo will serve as representative in the engineering development of airports and related facilities for the J. E. Greiner Co., Consulting Engineers, Baltimore, Md. He formerly was director of facilities for the Trans World Airlines passenger service department.

W. R. Holway and Associates have moved to their new engineering building at 1850 South Boulder, Tulsa, Okla.

Stephen Wehner, formerly chief hydraulic engineer of Pioneer Service & Engineering Co., is now consulting hydraulic engineer. Wilbur R. Barrows has been promoted to chief hydraulic engineer.

K. M. Clark Engineering Co., Minneapolis, Minn., has announced that Ralph P. Fredrickson has joined the firm to head up the municipal department. Fredrickson was formerly village engineer at Golden Valley, Minn.

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DAY-BRITE
Lighting Fixtures

HERE . . . MEANS BETTER SEEING HERE

Day-Brite Plexoline® fixtures help attract customers, display merchandise, stimulate buying and guide traffic in Jackson's Department Store, Coral Gables, Fla.

When sales are at stake...be Day-Brite sure!

About 85% of all impulse buying depends on the *eye appeal* of merchandise. If better seeing is this important to *your* client, don't compromise on lighting. Always specify Day-Brite—the nation's first choice in lighting fixtures. For proof of Day-Brite superiority, make your own comparison.

Day-Brite Lighting, Inc., 5479 Bulwer Ave., St. Louis 7, Missouri. Day-Brite Lighting, Inc., of California, 530 Martin Ave., Santa Clara, California.

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THE DAY-BRITE PLEXOLINE®
Handsome. Versatile. Economical. Ribbed plastic side panels and louvered bottoms. Available in 2- or 4-lamp units, in 4-foot and 8-foot lengths for Rapid Start and Slimline lamps. Hot-bonded enamel finish.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL

DECIDEDLY BETTER
DAY-BRITE
Lighting Fixtures

AND INDUSTRIAL LIGHTING EQUIPMENT

a guarantee of performance:

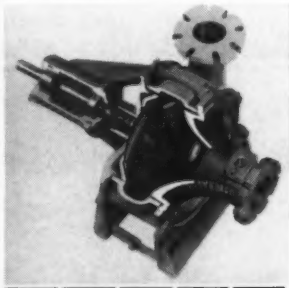
You can't clog a liquid impeller!

There is no clogging problem, because there is nothing to clog. Pumping action is caused by a *liquid* impeller, a swirling vortex of fluid.

- No constrictive impeller eye
- No constrictive discharge ports
- No wearing rings

Material flows completely unobstructed, from suction to discharge flange.

Write for complete details on the Wemco torque-flow Solids Pump and its amazing principle of operation.



WEMCO

TORQUE-FLOW

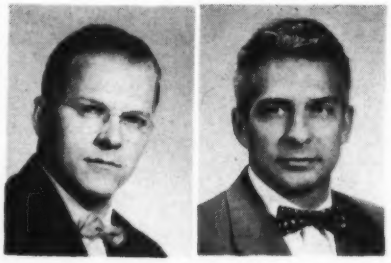
SOLIDS PUMP

WESTERN MACHINERY COMPANY

650 FIFTH STREET, SAN FRANCISCO 7, CALIF.

The Allstates Design and Development Co., Inc. has appointed Robert J. Hannon, former structural group leader, as staff engineer to head the highway engineering group of the company's Engineering Computer Section located at Trenton, N. J.

After 28 years service with Gibbs & Hill, Inc., Francis J. Lodas, assistant electrical engineer at the California office, has resigned to become an Associate with John Silver and Associates, of Los Angeles. He will specialize in lighting and industrial problems.



ZIEL BLOSSOM

The recently organized firm of P. H. Ziel — J. S. Blossom & Associates is now located in larger quarters at 206 East Sixth St., Cincinnati, Ohio.

Ziel has had extensive experience in the application of high temperature water for radiant space heating purposes. Blossom was formerly a member of a Detroit mechanical contracting firm. Allen Brown, Jr. is an Associate of the firm in charge of electrical engineering and Raymond H. Stevens, also an Associate, is in charge of heating and ventilating.

Three papers published by consulting engineers will be presented awards by the American Society of Civil Engineers at the annual meeting in New York City October 16.

The James Laurie Prize goes to Walter L. Dickey, chief civil and structural engineer, Bechtel Corp., and Glenn B. Woodruff, consulting engineer, both of San Francisco, for their paper on "Vibrations of Steel Stacks." George E. MacDonald, vice president of Lockwood, Kessler & Bartlett, Syosset, N.Y., will receive the Collingwood Prize for Junior Members for his paper on "Surveys and Maps for Pipelines." The Thomas A. Middlebrooks Award will go to John A. Focht, Jr., McClelland Engineers, Houston, Texas, and Charles I. Mansur, Mississippi River Commission, for "Pile-Loading Tests, Morganza Floodway Control Structure."

The Rochester section of the new New York State Association of Consulting Engineers has elected Frank E. Kulas as president. Other officers are: Vice president, Realto Cherne; secretary, Reginald Morrison; treasurer, Albert Hartsig; and directors, Eugene Haidt and Harold Hecker.

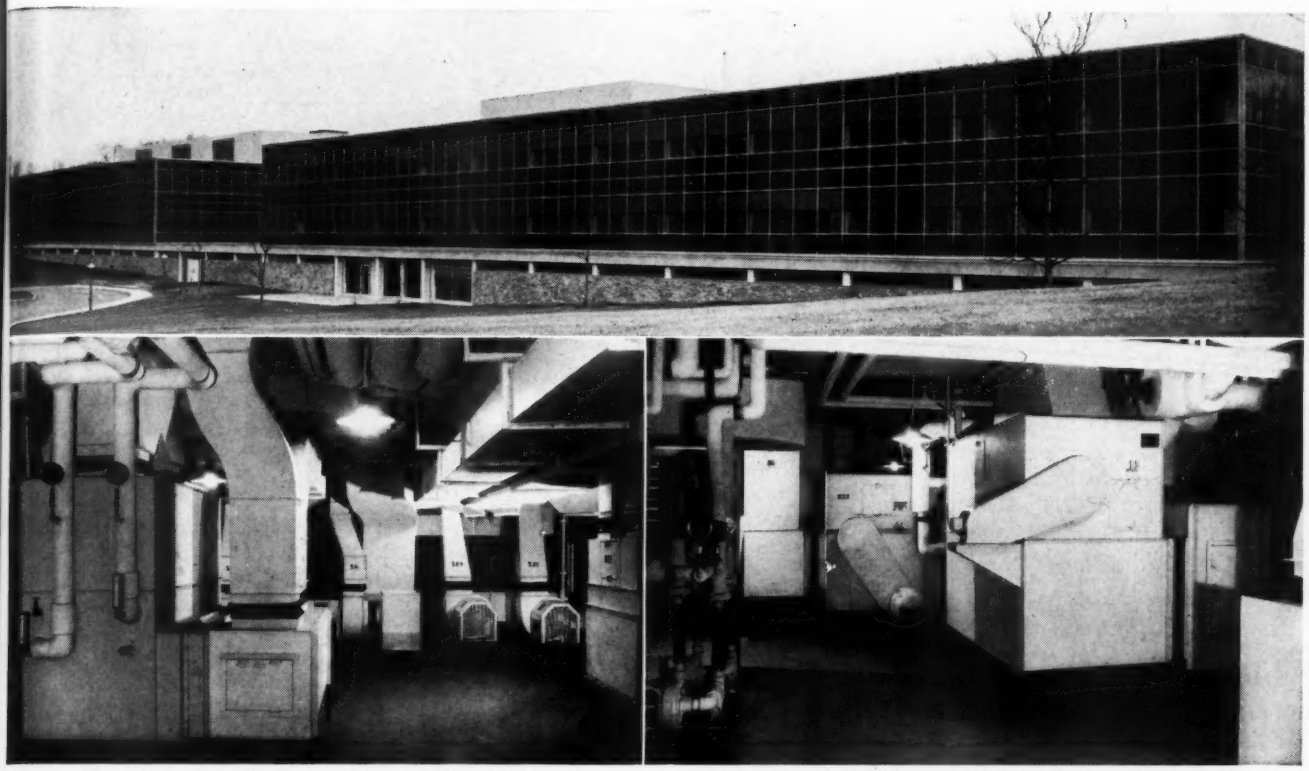
William T. Hill and John T. Percy have formed a partnership under the firm name of Hill & Percy, Engineers. Percy, formerly a teacher at Rensselaer Polytechnic Institute, has been a structural consultant with the Hill firm for the past several years. The firm will be located in the same offices, Union Block, Dalton, Mass.

Fischer & Associates, Inc., Cleveland, Ohio, has elected Wm. H. Coleman to its board of directors.

Herbert Hoover, III, of San Jose, Calif., son of the former Under Secretary of State and grandson of the former U.S. President, has been elected a junior member of the Society of Petroleum Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Both of the senior Hoovers are members of AIME, and the former President is AIME senior past president.

Stanley D. Michaelson, of Salt Lake City, Utah, chief engineer, Western Mining Division of Kennecott Copper Corp., has been nominated 1958 president of the Society of Mining Engineers of AIME.

Hunt Engineering Co., Lorell & Sicular, G. C. McKinney, and Park L. Verner have merged their offices under the firm name of McKinney Associates, Civil Engineers and Surveyors. Offices are at 2150 The Alameda, San Jose, Calif. ▲▲



On left, Clarage Multitherm supplying conditioned air to the electrophoresis balance room. Exhaust fans in background.

In foreground, Multitherm supplying make-up air exhausted by laboratory hoods.

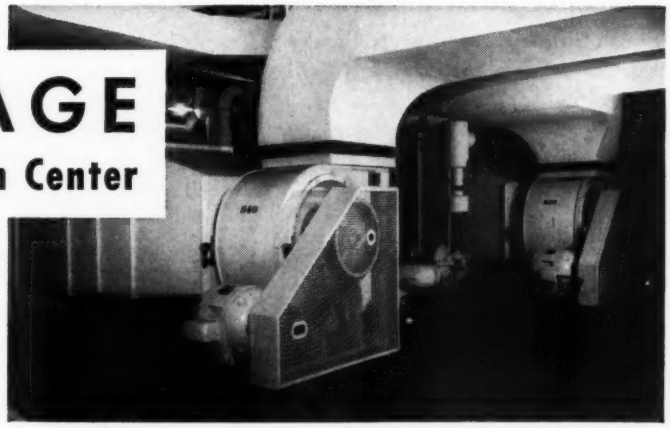
AIR via CLARAGE

in Wyeth's new Office and Research Center

One of the most modern of its type, this virtually window-lined building at Radnor, Pennsylvania serves Wyeth Laboratories, Inc.

As for so many other notable installations, Clarage equipment was chosen for the air handling and conditioning — Clarage Type NH and Type HV system fans, Multitherm air conditioning units, Ready Unit ventilating sets.

Clarage equipment has a long-standing reputation for doing the job quietly, economically, and dependably in buildings of all types, all sizes. Make sure *your* investment in air handling and conditioning is a profitable one by choosing Clarage quality.



Type HV fans supplying air to dining room and office interior.

ARCHITECT:
Skidmore, Owings & Merrill — New York City.

ENGINEER:
Seelye, Stevenson, Value & Knecht—New York City.

GENERAL CONTRACTOR:
George A. Fuller Co. — New York City.

MECHANICAL CONTRACTOR:
W. M. Anderson Co. — Philadelphia, Pa.

CLARAGE FAN COMPANY Kalamazoo, Mich.

. . . dependable equipment for making air your servant

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

New Projects Reported

By Consulting Engineers —

CALIFORNIA

James Gayner & Associates.
San Francisco, California.
Bank of America NT & SA, San Francisco, Calif. (mech., elec.) $5,000,000. Client, Bank of America.

Bank of America NT & SA, Sacramento, Calif. (mech., elec.) $2,000,000. Client, Bank of America.

Maurseth and Howe.
Los Angeles, California.
Wardlow Road, Palo Verde drainage. (soil investigation)

Channel bridge, Long Beach, Calif. (soil investigation) Client, City.

South Shore Elementary School site, Los Angeles, Calif. (soil investigation) Client, Los Angeles City Board of Education.

Bulot, Quigley & Clark, Inc.
Santa Ana, California.
Water project. (civil, struc., mech., elec.) $1,200,000. Client, Noreo Community Services District, Noreo.

Sewerage system and sewage disposal ($1,600,000) and other installations ($1,000,000). (civil, struc., mech., elec.) Client, Jurupa Community Services, Jurupa, Calif.

The E-L-E Company.
Los Angeles, California.
Production flight facilities, North American Aviation, Inc., Palmdale, Calif. $384,500 (elec.), $980,600 (mech.) Client, Woodford & Barnard, Arch.

George K. Porter Junior High School, North Hollywood, Calif. $197,900 (elec.), $352,100 (mech.) Client, Rowland H. Crawford, Arch.

Gledhill Elementary School, North Hollywood, Calif. $35,500 (elec.), $72,100 (mech.) Client, Walter L. Reichardt, Arch.

Southern California Gas Co., San Bernardino, Calif. $233,000 (elec.), $85,600 (mech.) Client, Allison and Rible, Arch.

Southern California Gas Co., Downley, Calif. $84,600 (elec.), $193,800 (mech.) Client, Allison and Rible.

Central Receiving Hospital, City of Los Angeles, Calif. $80,000 (elec.), $245,000 (mech.) Client, Chambers and Hibbard, Arch.

CONNECTICUT

Meyer, Strang & Jones.
New York, New York.
Southern New England Telephone Co., New Haven, Conn. (mech., elec.) Client, Office of Douglas Orr.

Legnos Associates.
Hartford, Connecticut.
A. I. Prince regional technical school. Hartford, Conn. (mech., elec.) $4,000,000. Client, Russell Hills.

Bristol High School, Bristol, Conn. (mech., elec.) $3,500,000. Client, Harold. A. Hayden.

Aircraft hangar, Bradley Field, Windsor Locks. (mech., elec.) $600,000. Client, A. Bruce Onderdonk.

Housing project, New Britain, Conn. (mech., elec.) $1,400,000. Client, Kane & Fairchild.

H. Ellis regional technical school, Danielson, Conn. (mech., elec.) $2,500,000. Client, Golden-Storrs.

Somers High School, Somers, Conn. (mech., elec.) $850,000. Client, Olson & Miller.

Employees' residence, Norwich State Hospital, Preston. (mech., elec.) $800,000. Client, Irven Goodman.

Housing project, Bristol, Conn. (mech., elec.) $1,000,000. Client, Rossetti, diCorcia & Mileto.

DELAWARE

L. E. Wooten and Company.
Raleigh, North Carolina.
Addition of 1400-kw generating capacity to municipal diesel generating plant and auxiliaries, Seaford, Del. (elec.) Client, City of Seaford.

DISTRICT OF COLUMBIA

Fortune Engineering Associates.
Alexandria, Virginia.
St. Thomas Moore House of Studies, Washington, D.C. (struc.) $416,000. Client, Frank Martinelli & Son, Arlington, Va.

FLORIDA

G. A. James Engineering Co.
Miami, Florida.
Two-story (open) motion picture studio. (struc.) $35,000. Client, World Wide Pictures.

Concrete block and stucco residence, Key Largo, Fla. (struc.) $18,000. Client, W. F. Van Sweringen.

Boathouse, machine and engine shop, U. S. Naval Air Station, Key West. (struc.) $47,000. Client, Navy.

Yacht basin and water distribution system, Key Largo, Fla. (civil) $18,000. Client, Laura O. Knowlson.

Cross Key Largo waterway, Key Largo, Fla. (civil) $45,000. Client, Florida Keys Chamber of Commerce.

R. L. Kenan & Associates, Inc.
Pensacola, Florida.
Water supply, distribution lines, and overhead tank. (civil) $150,000. Client, Town of Mary Esther, Fla.

Sewage and water improvements. (civil) $250,000. Client, Santa Rosa Island Authority, Pensacola, Fla.

Jas. Gamble Rogers, Lovelock & Fritz.
Winter Park, Florida.
3-story women's dormitory. Concrete block, stucco, tile roof, aluminum awning windows, elevator, hot water heat, resilient floors, built-in furniture. $610,000. Client, Rollins College, Winter Park, Fla.

Dining facilities, 1-story, concrete block, stucco, tile roof. Built-in refrigeration, aluminum windows, tile floors, steel joists. Kitchen and service equipment included. Hot water heat. $335,000. Client, Rollins College, Winter Park, Fla.

Osceola County jail. 2-story, concrete frame, concrete blocks, brick facing, hot water heat. Aluminum awning windows, concrete floors, built-up roof, steel prison equipment, and kitchen equipment. $200,000. Client, Osceola County Commissioners, Kissimmee, Fla.

Orange County courthouse annex, Orlando, Fla. 7-story, steel frame, aluminum window wall, marble, Puerto Rican tile, summer-winter air conditioning, jail equipment, steel deck flooring system, three elevators. $3,200,000. Client, Orange County Commissioners, Orlando.

Gerald J. Spolter.
Miami Beach, Florida.
Kett Technical Center, Pompano

USS "T-1" Steel reduces weight of lift truck carriage assembly by 66%

INCREASES PAY LOAD PROPORTIONATELY

THE YARDLIFT 350®, manufactured by Ross Carrier Division of Clark Equipment Company, is designed to handle heavy materials on uneven ground. It has a lifting capacity of 35,000 pounds. Many vital strength members of the lifting mechanism are fabricated of USS "T-1" Steel. The reason is elementary: in fork-truck design every extra pound of mechanism forward of the front wheels reduces the machine's load capacity.

According to Clark design computations, the YARDLIFT 350's carriage assembly, if made of structural carbon steel, would have weighed nearly 3 times as much as the "T-1" Steel assembly to obtain the same capacity. And it would have been 3 times bulkier. USS "T-1" Steel, in other words, permitted maximum load capacity at *one-third* the weight and size . . . and increased payload substantially.

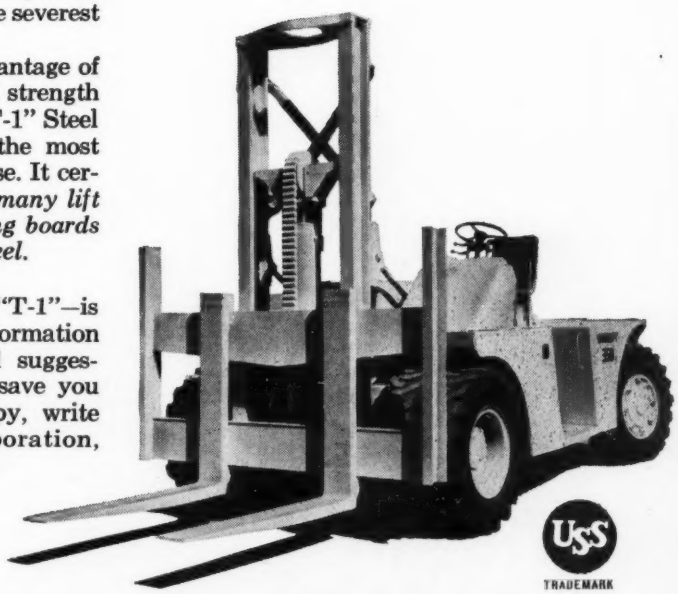
The secret is USS "T-1" Steel's 90,000 psi yield point, nearly 3 times that of structural carbon steel. It is this strength that helped make the YARDLIFT 350 possible. And USS "T-1" Steel's high impact resistance and toughness, even at sub-zero temperatures, enable the YARDLIFT 350 to withstand the jolts and jars of rough yard work even in the severest winter weather.

Why don't you take advantage of the unique combination of strength and toughness that USS "T-1" Steel has to offer? It may be the most economical steel you can use. It certainly is at Clark because *many lift trucks now on their drawing boards incorporate USS "T-1" Steel.*

• • •

Our new catalog—USS "T-1"—is complete with technical information and offers many practical suggestions for its use that can save you money. For your free copy, write United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

The use of USS "T-1" Steel in the Clark YARDLIFT 350 carriage resulted in vital savings in both weight and space—kept dimensions to a minimum while maintaining lifting capacity of 35,000 pounds.



USS TRADEMARK

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel Division, San Francisco • Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors, Coast-to-Coast • United States Steel Export Company, New York

Remember that we also make USS COR-TEN, USS TRI-TEN and USS MAN-TEN Steels . . . standards for heavy-duty equipment.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

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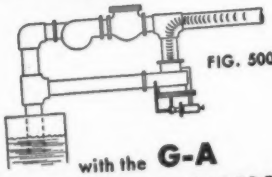
UNITED STATES STEEL

Anticipate Surge



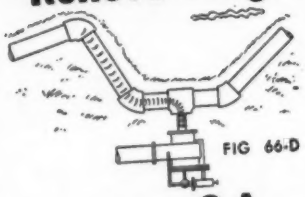
with the **G-A**

ANTI-SURGE VALVE

Bulletin W-16

Valve opens on pump shut down —before surge occurs. Valve closes slowly at predetermined speed as pressure subsides—but is equipped to reopen for any re-occurring surge symptoms.

Relieve Surge



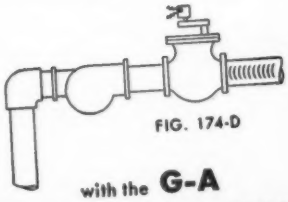
with the **G-A**

SURGE RELIEF VALVE

Bulletin W-2

When surges are initiated by the gradient of the pipe line, or by quick shut-off in the line, the pipe is protected and relief provided by G-A Surge relief valves.

Prevent Surge



with the **G-A**

ELECTRIC CHECK VALVE

Bulletin W-10

Electrically operated, the valve does not open until the pump comes up to speed, closes 95% before switch automatically shuts down pump.

Technical bulletins—numbered above—contain complete descriptive information. Your copies available on request.

GOLDEN ANDERSON

Valve Specialty Company

1280 RIDGE AVE. • PITTSBURGH 33, PA.

Designers and Manufacturers of

VALVES FOR AUTOMATION

Beach, Fla. Engineering and experimental buildings. (struc.) $275,000. Client, Emory Jackson, Arch., Miami, Fla.

GEORGIA

Dan E. Sewell and Associates.
Savannah, Georgia.
Box factory addition. Steel frame warehouse with 25-ft clear ceiling height, aluminum siding, second story office over shipping area, 40-ton air conditioning for office. Entire structure sprinkled. (civil, struc., mech., elec., arch.) $500,000. Client, Union Bag-Camp Paper Corp., Savannah, Ga.

Cottrell thickener, underflow tank, overflow tank, running tank, storage tank, all Hypalon lined. Pipe, pumps, fittings, Saran lined. (civil, struc., mech., elec.) $120,000. Client, American Cyanamid Co., Savannah.

IDAHO

H. A. Sewell & J. A. Sewell.
Newport, Washington.
Priest Lake power project. Hydroelectric project on Priest River, Idaho, 4250 kw. $1,300,000. Client, Northern Lights, Inc., Sandpoint.

H. E. Bovay, Jr., Consulting Engineer.
Spokane, Washington.
Water supply system, Cottonwood, Idaho. $150,000. Client, Seattle District Corps of Engineers.

Johnson & Underkofler.
Nampa, Idaho.
Contract to give City of Nampa, Idaho complete year around engineering service for all normal budgetary expenditures. (civil) $1,000,000. Client, City of Nampa, Idaho.

ILLINOIS

Thomas J. Higgins Associates, Inc.
Chicago, Illinois.
9-classroom, 1-story brick school building, 12,000 sq ft, hot water heating, fin radiation, incandescent lighting, 20,000 sq ft paving. (arch., civil, struc., mech., elec.) $200,000. Client, Lake Villa Consolidated School District No. 41, Lake Villa.

8-classroom, 1-story brick school building, 10,500 sq ft, hot water heating and fin radiation. Fluorescent lighting. (arch., civil, struc., mech., elec.) $170,000. Client, Board of Education, School District No. 70, Morton Grove, Ill.

INDIANA

Maurice L. Miller & Stephen A. Derry.
Louisville, Kentucky.
Waterworks improvement including water treatment plant. Client, City of Boonville, Ind.

IOWA

Frank L. Pulley.
Des Moines, Iowa.
School addition, Gowrie, Iowa. $402,000 (est.) Client, Karl Keffer Assoc.

KANSAS

Raymond H. Reed & Company.
Columbus, Nebraska.
50 miles distribution line. (elec.) $50,000. Client, NCK Electric Cooperative, Belleville, Kans.

S. J. Callahan & Company.
Kansas City, Missouri.
Structural steel fabricating plant, Kansas City, Kans. (civil, struc., mech., elec.) $500,000. Client, Brown-Strauss Corp.

LOUISIANA

E. M. Freeman and Associates.
Shreveport, Louisiana.
Greenwood-Shreveport Interstate Highway. (civil, struc.) $7,000,000. Client, Louisiana Department of Highways.

Runway and over-run paving, and lighting, Barksdale Air Force Base, Shreveport, La. (civil, struc., mech., elec.) $1,800,000. Client, Corps of Engineers, Little Rock District.

Blast deflectors, apron widening, Barksdale Air Force Base, Shreveport, La. (civil, struc.) $950,000. Client, Corps of Engineers, Little Rock District.

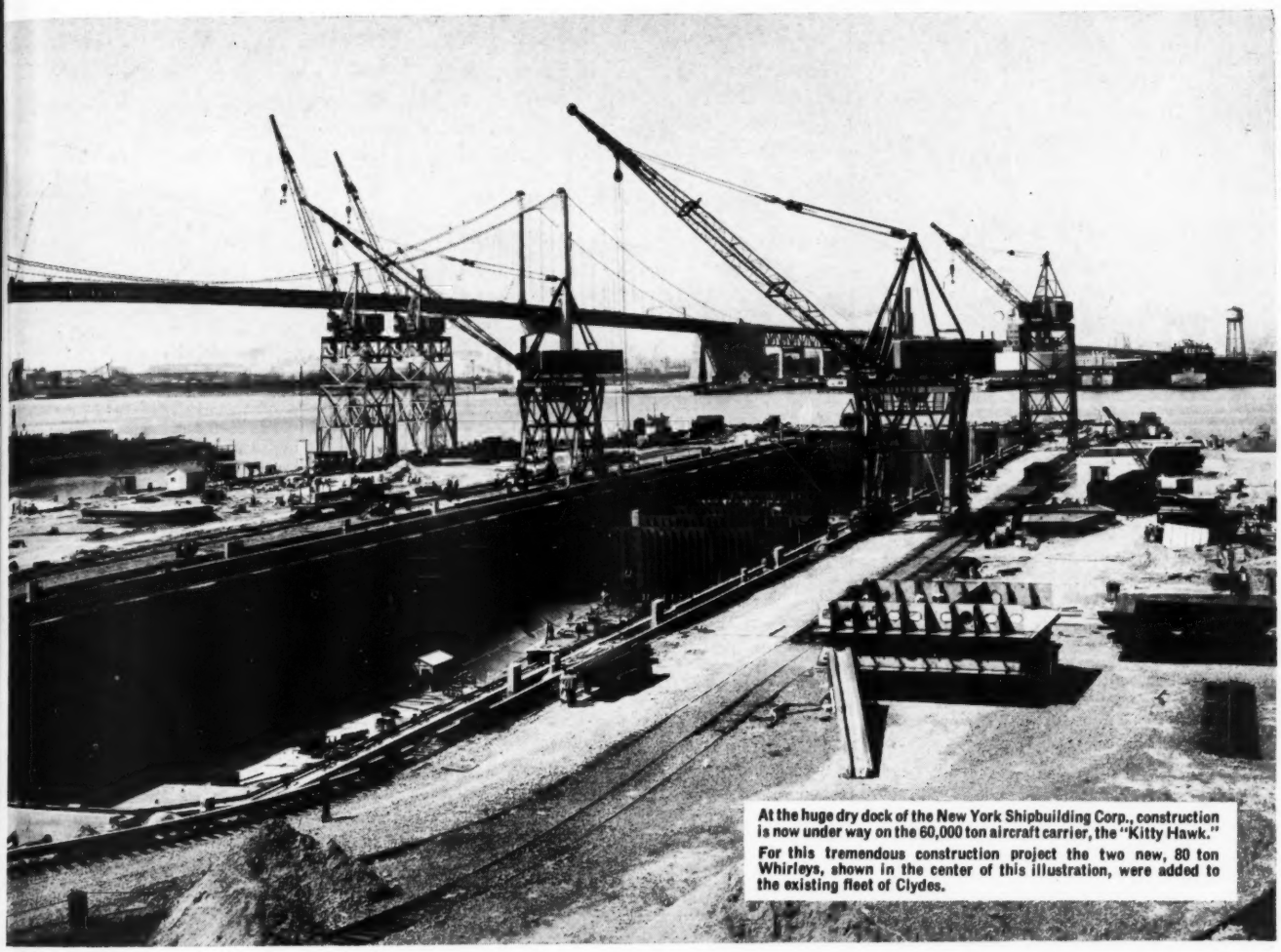
Louis N. Goodman and Associates.
New Orleans, Louisiana.
Terminal building, Moisant International Airport, New Orleans, La. (elec.) $600,000. Client, Goldstein, Parham and Lobomsiu, Benson and Riehl, Arch.

J. J. Krebs & Sons.
New Orleans, Louisiana.
Design approximately 10,000 linear feet of street improvements. (civil) $350,000. Client, City of New Orleans.

George Covert & Associates, Inc.
Baton Rouge, Louisiana.
Denham Springs, La. Additions to water and gas systems, street paving, sewerage extensions. (civil) $1,000,000. Client, Town of Denham Springs.

Street paving, water, gas and sewerage. St. Louis subdivision, Plaquemine, La. (civil) $800,000. Client, St. Louis Development Co., Inc., Plaquemine, La.

Plans and specifications, street widening, Baton Rouge, La. (civil)



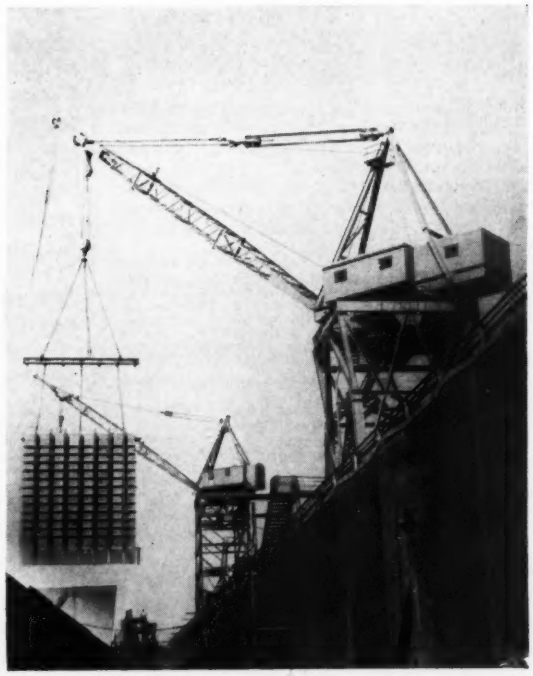
At the huge dry dock of the New York Shipbuilding Corp., construction is now under way on the 60,000 ton aircraft carrier, the "Kitty Hawk." For this tremendous construction project the two new, 80 ton Whirleys, shown in the center of this illustration, were added to the existing fleet of Clydes.

$120,000,000 construction project uses five Clyde Whirleys

With a four acre flight deck one-fifth of a mile long and an overall height equal to a twenty-five story building, this $120,000,000 construction project requires a tremendous amount of material handling know-how. Placing 52,000 tons of structural steel, 1,000 tons of aluminum, 180 miles of piping, 290 miles of cable . . . keeping materials moving on schedule . . . this is the assignment handed the five Clyde Whirleys by New York Ship.

Clyde's full revolving, self-propelled Whirleys have an established reputation of easiest, safest handling . . . equal load distribution on the fully supported turntable . . . a work-capacity that knows no equal! That's why Clyde Whirleys are preferred on major construction projects, at rail transfer terminals, for extra heavy cargo handling at leading ports around the world.

Whatever your material handling problems, it will pay you well to investigate the complete line of Clyde's *performance-proved* Whirleys, Hoists, Derricks, Whirlettes, Car Pullers, Unloaders, and deck and dock material handling equipment. The use of Clyde's Engineering Department is yours without obligation.



CLYDE RIC REPUBLIC INDUSTRIAL CORPORATION

CLYDE IRON WORKS, Inc.

Established 1899

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HOISTS : DERRICKS : WHIRLEYS : UNLOADERS
BUILDERS TOWERS : CAR PULLERS : ROLLERS

There's more to a sound system

THAN SIMPLY GETTING ATTENTION!

it's JOB ENGINEERING that makes the difference between an ordinary installation and a

DUKANE

integrated communication system!

Thousands of successful DuKane installations in **FACTORIES, SCHOOLS, HOSPITALS, HOTELS** and **CHURCHES** are 'sound' testimony to the engineering perfection of DuKane Sound Systems.

DUKANE *SYSTEMS OFFER:*

- sound & paging
- alarm evacuation
- special control functions
- intercom
- time signals
- radio distribution or entertainment
- nurses' call
- private telephones

In each case, installations are engineered for the specific job, using DuKane mass-produced interchangeable component panels in the desired combination. Flexibility, moderate cost and *accurate control of sound* is the result. DuKane Sound Systems are sold and serviced by a nationwide organization of experienced engineering distributors.

SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

SCHOOL & INDUSTRIAL SOUND SYSTEMS • FLEXIFONE INTERCOM • PRIVATE TELEPHONE SYSTEMS • NURSES' CALL SYSTEMS • MICROMATIC SOUND SLIDEFILM PROJECTORS and electronics for the armed forces.

Please send me the facts on how I can get 'job engineering' in a sound system.

DuKane Corporation, Dept. CE-97
St. Charles, Illinois

NAME_____

ADDRESS_____

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REPRESENTING_____

Leaders in Creative Communications

$400,000. Client, City of Baton Rouge.

Alsen-Port Hudson Highway, East Baton Rouge Parish. (civil, struc.) $500,000. Client, Louisiana Department of Highways, Baton Rouge, La.

MAINE

American Hydrotherm.
Long Island City, N. Y.
Loring Air Force Base, Limestone, Me. Additions to central heating plant. (struc., mech., elec.) $1,000,000. Client, Corps of Engineers, New England Division.

MARYLAND

Penniman & Browne, Inc.
Baltimore, Maryland.
Subsurface exploration at 36 structure sites on Baltimore Beltway between U.S. 40 and Belair Rd. (civil) Client, Maryland State Roads Commission and Michael Baker, Jr., Inc.

Finney, Dodson, Smeallie, Orrick and Assoc., Architects-Engineers.
Baltimore, Maryland.
Electronics laboratory, Timonium, Md. (arch., mech., elec.) $200,000. Client, Kilmarnock Associates.

Laboratory School, Towson State Teachers College, Md. (arch., mech., elec.) $700,000. Client, State.

Elementary school, Easton, Md. (arch., mech., elec.) $350,000. Client, Talbot County, Md.

Tilghman's Island, Md. (arch., mech., elec.) $150,000.

Shopping center building, Baltimore, Md. (arch., mech., elec.) $150,000. Client, M. Cooper Walker.

MASSACHUSETTS

Howard E. Murphy.
Cohasset, Massachusetts.
Consultation services related to engineering and management of municipal lighting plant. (elec.) Client, Town of Hingham, Mass.

Automation Management, Inc.
Westboro, Massachusetts.
Work simplification and mechanization of placing packs of mail in trays. $15,000. Client, U.S. Post Office.

MICHIGAN

Hugh V. Walker.
Flint, Michigan.
Third Avenue Baptist Church addition, Flint, Mich. (civil, struc., mech., elec.) $78,650. Client, Third Avenue Baptist Church.

Williams and Works.
Grand Rapids, Michigan.
Sewage treatment plant improvements. (civil, mech.) $120,000. Client, City of Fremont, Mich.

Sanitary sewer extensions and sewage pumping station. (civil) $40,000. Client, City of Gladstone, Mich.

Grand Rapids Expressway, survey and plans. (civil) $5,000,000. Client, Michigan State Highway Dept.

Report on sewage treatment. (civil) Client, City of Dowagiac, Mich.

Michigan Associates.
Lansing, Michigan.
Design five bridges on US-112. (civil) $700,000. Client, State of Michigan.

Design four bridges on US-27 (relocation). (civil) $595,000. Client, State of Michigan.

Design eleven bridges on Northwestern Highway. (civil) $4,100,000. Client, State of Michigan.

Design highway relocation, US-112. (civil) $3,650,000. Client, State.

W. L. Badger and Associates, Inc.
Ann Arbor, Mich.
Pilot plant for study of evaporation of sea water. (chem.) $150,000. Client, Saline Water Program, U. S. Department of Interior.

R. H. Gove.
Kalamazoo, Michigan.
5200-ft collector sewer, sewage treatment plant. (civil) $120,000. Client, Village of Saugatuck, Mich.

MINNESOTA

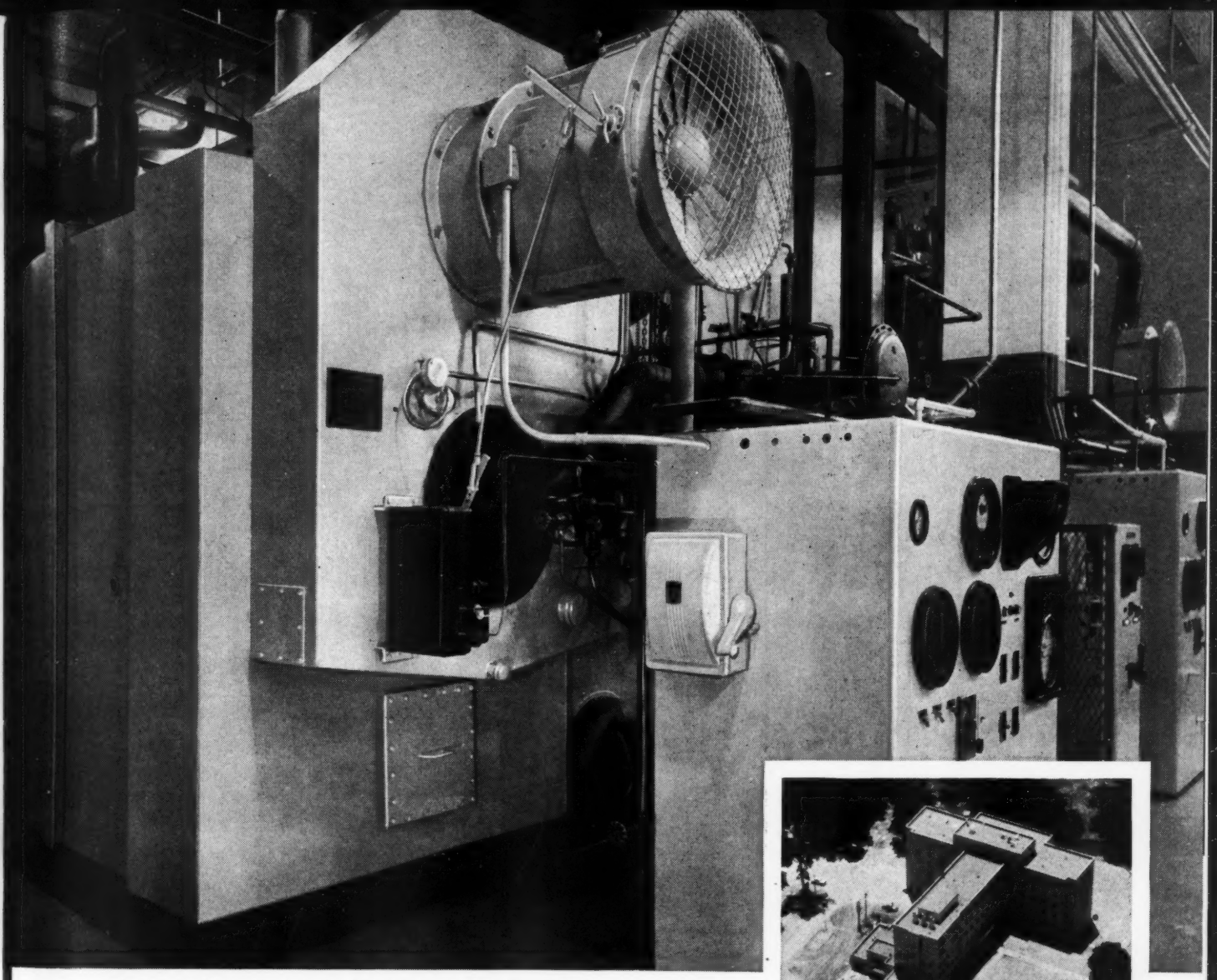
S. J. Nestaval
St. Paul, Minnesota.
Street improvements. (civil) $25,000. Client, Village of Rosemount, Minn.

Charles A. Larson.
Fergus Falls, Minnesota.
New 125-hp boiler, four blast heating coils, fan, ventilation ducts, radiators and controls for consolidated school, Middle River, Minn.

L. W. Burdick.
Grand Forks, North Dakota.
Construction of storm sewer and concrete paving for business section of Warren, Minn. (civil) $300,000. Client, City of Warren, Minn.

Construction of sewage disposal system consisting of collection system, sewage lift station, and sewage lagoon. (civil) $100,000. Client, City of Clinton, Minn.

Jos. V. Edeskuty & Associates.
Minneapolis, Minnesota.
Hastings State Hospital, Hastings, Minn. Boiler plant, turbine, and storm sewer. (civil, struc., mech., elec.) $925,000. Client, State



Dual unit installation of B&W Type FM Integral-Furnace Boilers at Barberton Citizens Hospital. Consulting Engineers: William E. Bodenstein and W. W. Shuster. Architects: Samuel Hannaford & Sons. Heating, Ventilating, Plumbing: T. O. Murphy Company.

Low Cost Steam Does Many Jobs

B&W 'PACKAGE' BOILERS SERVE BARBERTON CITIZENS HOSPITAL

Two B&W Type FM Integral-Furnace Boilers are the reliable source of plentiful, low cost steam that is put to many uses at Barberton Citizens Hospital, Barberton, Ohio. The gas-fired boilers, which can also use oil as a stand-by fuel, are automatically controlled to operate under minimum supervision.

Combined Capacity of the two units is 41,000 lbs of steam per hr, enough to supply an additional wing, should one be erected in the future. Both are "package" boilers, completely shop assembled. They only required service connections after installation.

The 250-Bed hospital, with a total of 560 rooms, uses steam for heating, sterilizers, a restaurant serving 37,000 meals a month, and a laundry that can handle 13½ pounds of linen per patient per day.

Long Life, low maintenance, reliability, continuity of operation, and efficiency have been proved for B&W Integral-Furnace Boilers in hundreds of installations in institutions and industry throughout the nation. They provide maximum capacity in small boiler room space, high fuel economy, and economical, fast steaming. They have built a reputation for quick response to wide load swings.

B&W Provides a single responsibility in design, engineering, manufacturing, installation, and service through a national network of plants and engineers. For detailed information on B&W Integral-Furnace Boilers, write for Bulletin G-76D. The Babcock & Wilcox Company, Boiler Division, Dept. AR-3, 161 East 42nd Street, New York 17, N. Y.

G-841-FM

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BOILER DIVISION

Fins are Fine for Fish

...NOT CONCRETE

THESE PHOTOS tell the story. Fir plywood reduces fins and joints to an absolute minimum . . . forms smoother, better looking concrete . . . cuts finishing time and costs. Fir plywood forms cut application time and costs, too. Interior PlyForm® grade gives up to 10-12 reuses; Exterior PlyForm® 25 or more; Overlaid plywood as many as 200!

specify DFPA TESTED QUALITY

Fir Plywood

CONCRETE FORMS

FREE: New portfolio to help you design and use fir plywood forms. Contains complete specification, construction and design data.

DOUGLAS FIR PLYWOOD ASSOCIATION
Dept. 146, Tacoma 2, Wash.
Please send new Fir Plywood Concrete Form Portfolio. (Offer good USA only)

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MISSOURI

Uri Seiden & Associates.
Kansas City, Missouri.
New Ruskin High School, Kansas City, Mo. 3-story concrete frame with precast floor construction. $2,000,000. Client, Frangkiser & Hutchens.

MONTANA

H. E. Bovay, Jr., Consulting Engineer.
Spokane, Washington.
Hydro-dam renovation, Troy, Mont. $50,000. Client, Montana Light & Power Co.

Silver Bow County Hospital. (mech., elec.) Butte, Mont. $2,000,000. Client, Norman J. Hamill & Assoc.

Survey and report, five water systems. Montana and Oregon.

L. W. Burdick.
Grand Forks, North Dakota.
Construction of sewage disposal system and lagoons. (civil) $300,000. Client, City of Culbertson, Mont.

NEBRASKA

Leo A. Daly Company.
Omaha, Nebraska.
Interceptor sewers and primary sewage treatment, Norfolk, Nebr. (civil, struc., mech., elec.) $350,000. Client, City Council, Norfolk, Nebr.

Water softening plant, Blair, Nebr. (civil, struc., mech., elec.) $100,000. Client, Board of Public Works.

Water supply line, Blair, Nebr. (civil) $150,000. Client, Board of Public Works, Blair, Nebr.

Redman Avenue storm sewer, Omaha, Nebr. (civil) $150,000. Client, City of Omaha, Nebr.

Cole Creek sanitary sewer, Omaha, Nebr. (civil) $180,000. Client, City.

Site grading, utilities, and street improvements for family housing at 20 sites in north central and north pacific states. (civil, struc., mech., elec.) $1,500,000. Client, Headquarters, Air Defense Command.

NEW HAMPSHIRE

Consulting Engineers, Inc.
Boston, Massachusetts.
Sewers and sewage treatment facility. (civil) $17,000. Client, City of Dover, N. H.

NEW JERSEY

Angus D. Henderson, Consulting Engineer.
Westbury, New York.
City of East Orange, N. J. Ten new wells, pumps, motors, water mains, electrical transmission lines, telemetering, and remote controls. (civil, elec.) $750,000. Client, Board of Water Commissioners.

Andre H. Vanderzanden.
River Edge, New Jersey.
St. Luke's Episcopal Church, Haworth, N. J. Structural engineering involving reinforced concrete foundations, laminated timber arches and girders. Precast longspan concrete roof on masonry bearing walls. (struc.) $170,000. Client, John Trich, Arch., Oradell, N. J.

NEW MEXICO

Dr. Marcello Giomi & Associates.
Albuquerque, New Mexico.
Junior high school, Roswell, N.M., heating and ventilating. (mech.) $600,000, Client, F. M. Standhardt.

Heavy bomber hangar, Walker Air Force Base, N. M. Air conditioning. (mech.) $150,000. Client, E. French.

Sales exchange building, Kirtland Air Force Base, N.M. Heating, evaporative cooling, plumbing. (mech.) $375,000. Client, Burwinkle & Milner.

NEW YORK

Chester Schiff, Electrical Engineer.
New York, New York.
90,000-sq-ft new plant for Associated Brands, Brooklyn. (elec.) $50,000.

Gennaro Mianulli.
Brooklyn, New York.
8-story apartment house, Brooklyn, N.Y. (struc.) $500,000. Client, Michael Frudakis, Arch.

Industrial building and warehouse. (struc.) $250,000. Client, Michael Frudakis, Arch.

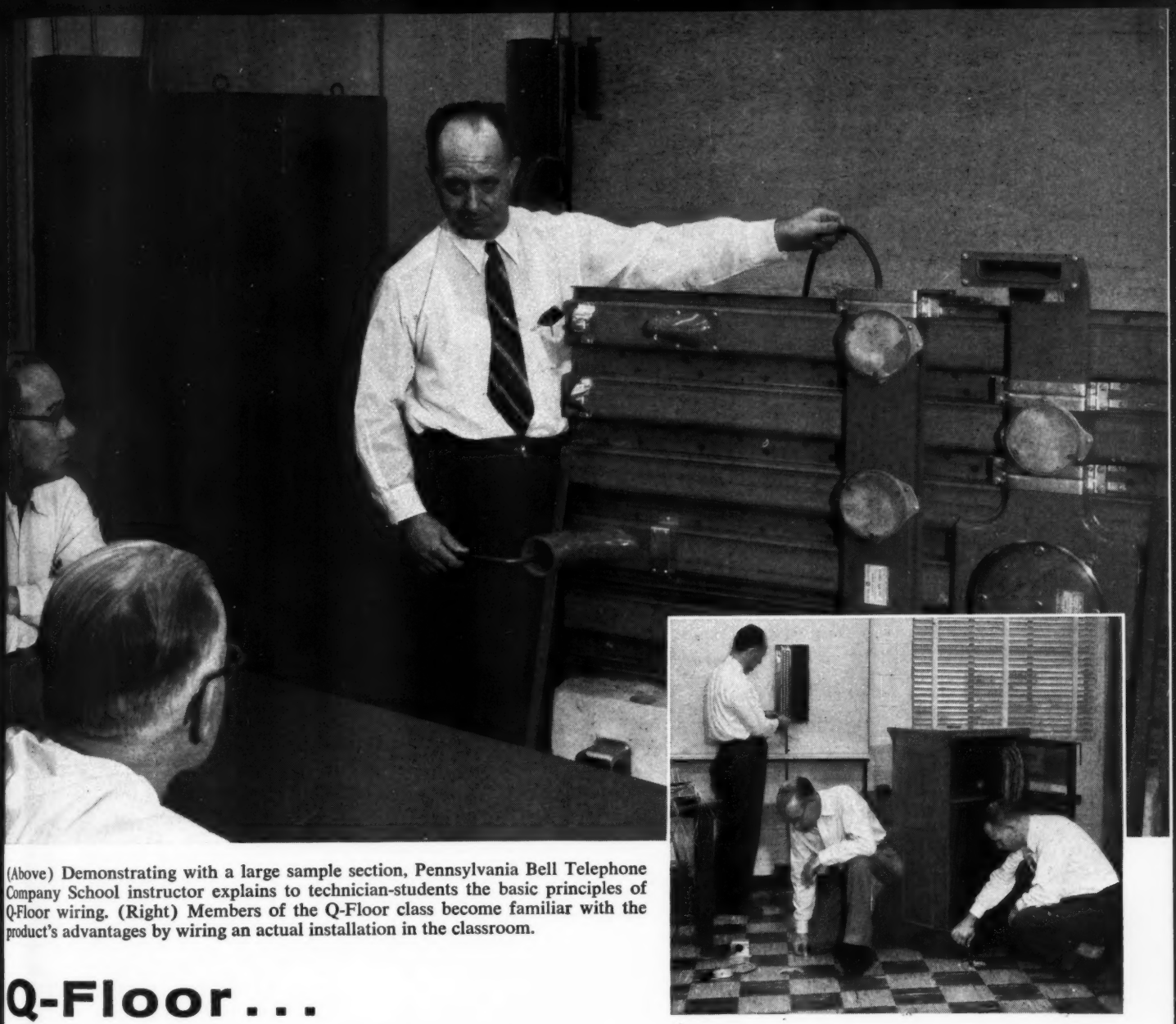
Soil tests and foundation, housing project. (struc.) $800,000. Client, Scrane Humas, Brooklyn, N.Y.

Soil load tests and foundation. (struc.) $600,000. Client, Eighth Ave. L Corp., Brooklyn, N.Y.

Transfiguration Roman Catholic Church (struc.) $350,000. Client, Brooklyn Roman Catholic Diocese.

L. M. Todd.
New York, New York.
Several projects involving engineering and patent consulting work in chemical process plants.

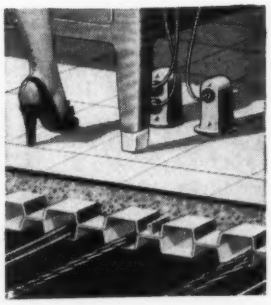
Fred S. Dubin Associates.
Hartford, Connecticut.
Design Coast Guard Headquarters Building and docks at Battery Park, N.Y., containing headquarters offices, barracks, dining facilities, docks, and small boat basin. Joint



(Above) Demonstrating with a large sample section, Pennsylvania Bell Telephone Company School instructor explains to technician-students the basic principles of Q-Floor wiring. (Right) Members of the Q-Floor class become familiar with the product's advantages by wiring an actual installation in the classroom.

Q-Floor...
a Required Subject at this School

Every year, an estimated 1,600 Bell Telephone Company of Pennsylvania technicians attend a special school near Harrisburg, Pa. to learn the latest practice in line and equipment installation. Bell feels that cellular steel subflooring is so important that an entire classroom is devoted to the subject of Q-Floor wiring. Here the students learn by working with an actual Q-Floor installation that wires can be pulled and telephone or electrical outlets established often in a matter of minutes, and that every six-inch area of the entire floor is available for outlet use. This flexibility, so graphically pointed out to Bell students, plus substantial savings in construction time and money has influenced owners and architects all over America to provide for the future by building with Q-Floor today. Use the coupon to write for literature.



With Q-Floor performing its dual function of a structural subfloor and as a close-module underfloor wiring distribution system, building owners, designers and contractors benefit from construction speed, convenience and complete wiring flexibility.

Today's finest buildings are built with **Robertson**

Q-Floor

The STANDARD sub-floor construction for modern buildings

H. H. Robertson Company

2431 Farmers Bank Building, Pittsburgh 22, Pa.

In England—Robertson Thain Ltd., Ellesmere, Cheshire

In Canada—Robertson-Irwin Ltd., Hamilton, Ontario • Edmonton, Alberta

Please send 44-page Q-Floor Manual.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

HOW TO GET AROUND TIME and COST FACTORS

in Protecting Pipe Against Corrosion

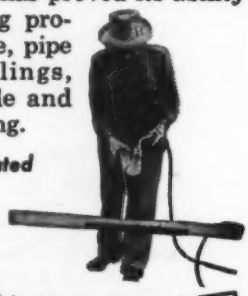
When you are faced with the problem of protecting piping underground in highly corrosive soils, a high quality coal tar coating such as called for in AWWA Specifications C-203 and C-204 is normally hot applied at a pipe coating mill. However, in many cases, the volume of pipe does not warrant this expense or the coating mill is too far away to justify the time involved.

That's WHEN Engineers Specify TAPECOAT . . . the practical alternate hot-applied coal tar coating in handy tape form

Because TAPECOAT provides a coal tar coating equivalent in long-life protection to hot-applied coating at the mill, engineers are specifying this quality alternate material where time and cost factors preclude mill application.

This practical solution assures the protection required without the need for tar kettles, technical know-how and special crews. Field application costs are reduced because TAPECOAT is so easy to apply, using a torch to soften or bleed the pitch and then spirally wrapping it on the vulnerable surface.

TAPECOAT comes in handy rolls of 2″, 3″, 4″, 6″, 18″ and 24″ widths. Since 1941, it has proved its ability to give lasting protection to pipe, pipe joints, couplings, conduit, cable and insulated piping.



Write for illustrated brochure.

The TAPECOAT *Company*

Originators of Coal Tar Coating in Tape Form

1569 Lyons Street
Evanston, Illinois

venture with Fred G. Frost, Jr. Associates, New York. $1,000,000.

American Hydrotherm.
Long Island City, N.Y.
Luna Park housing project, 1500 units, Brooklyn, N.Y. (mech., elec.) $4,500,000. Client, New York City Housing Authority, Kelly & Gruzen, Arch., New York, N.Y.

Angus D. Henderson, Consulting Engineer.
Westbury, New York.
Nassau County, N.Y. New transmission water mains in Shelter Rock Road. (civil) $75,000. Client, Board of Water Commissioners, Manhasset.

Maurice Courland & Son, Architect-Engineer.
New York, New York.
Public School No. 28 (Manhattan), kindergarten through 6th grade. 1651-pupil capacity, 44 classrooms, 7 special-case classrooms, 4 kindergartens, auditorium, lunchroom, gym, auxiliary, and accessory facilities. Playgrounds. (civil, struc., mech., elec.) $2,900,000 (est.) Client, Board of Education of the City of New York.

Charles N. Ehrlich.
New York, New York.
Design of clamp-on (ammeter, voltmeter, ohm meter) combination for use by electricians. (mech., elec.) Client, Pyramid Instrument Corp., Lynbrook, N.Y.

NORTH CAROLINA

John R. Gove, Engineer.
Hendersonville, North Carolina.
Water lines and streets, Pisgah Heights, Brevard, N.C. (civil) $26,000. Client, Pisgah Heights Corp., Brevard, N.C.

Kegarise Engineering Co.
Winston-Salem, North Carolina.
New boiler plant and additions to factory, Asheboro, N.C. (civil, struc., mech., elec.) $100,000. Client, Dixie Furniture Co., Asheboro, N.C.

Furniture factory, 200,000 sq ft, Waynesville, N.C. (civil, struc., mech., elec.) $4,000,000. Client, Anagusta Mfg. Co., Waynesville, N.C.

NORTH DAKOTA

North Central Engineers.
Jamestown, North Dakota.
Municipal water plant, Cando, N.D. $135,000. Client, Cando, N.D.

Water well, pumps, and supply line, Finley, N.D. $40,000. Client, Finley.

Sanitary sewerage system and disposal lagoon, Starkweather, N.D. $70,000. Client, Starkweather, N.D.

B. W. Carlson.
Bismarck, North Dakota.
Civil Defense Survival Plan Director. Organize staff and prepare state survival plan. Client, North Dakota Civil Defense Commission.

L. W. Burdick.
Grand Forks, North Dakota.
Elevated water storage tank, water distribution system, and new sewage disposal system utilizing sewage lagoon for treatment. (civil) $200,000. Client, Village of Hannaford, N.D.

Sewage disposal system with primary and secondary sewage lagoons as method of treatment. New lift station and remodel existing lift stations. (civil) $400,000. Client, City of Southwest Fargo, N.D.

OHIO

Russell S. Fling.
Columbus, Ohio.
Grant Hospital, Columbus, Ohio, 9-story building. (struc.) $6,000,000. Client, Karlsberger, McClellan & Gallogly, Arch.

New dial office building, Ohio Bell Telephone Co., Upper Sandusky, Ohio. (struc.) $300,000. Client, Sims, Cornelius & Schooley, Arch.

OKLAHOMA

J. B. Payne & Associates, Inc.
Enid, Oklahoma.
City street paving in Fairview, Okla. Concrete curb and gutter, soil cement base, double bituminous surfacing. (civil) $120,000. Client, City of Fairview.

OREGON

H. E. Bovay, Jr., Consulting Engineer.
Spokane, Washington.
Survey and report, five water systems, Oregon and Montana.

James & Honey.
Portland, Oregon.
Purification plant, 240 x 75 feet with 6-story tower. Prestressed and precast concrete beams, channel roof slabs. $200,000 (equipment, under $1,000,000) Client, Wah Chang Corp., New York, N.Y.

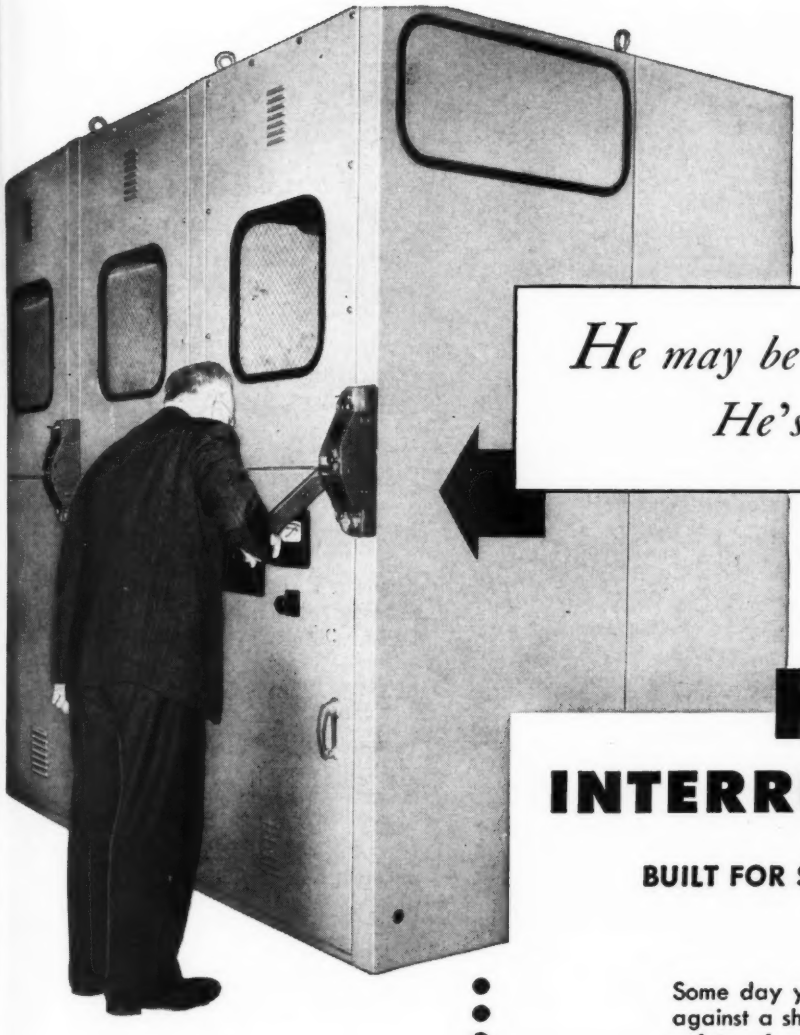
PENNSYLVANIA

Ebert & Park.
Pittsburgh, Pennsylvania.
Parking Authority — Garage "S." $1,500,000. Client, B. K. Johnstone.

Parking Authority — Garage "Y." $900,000. Client, Hoffman & Crumpton, Arch.

Pittsburgh YMCA alterations $150,000. Client, Inghow, Boyd & Pratt.

West Greene High School, Greene



He may be closing against a fault.
He's not worried . . .

It's an

HPL-C
INTERRUPTER SWITCH

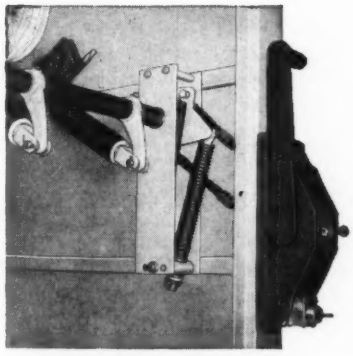
BUILT FOR SAFE OPERATION—
EVEN AGAINST SHORT CIRCUITS

Some day you may close an interrupter switch against a short circuit. For your safety, and the safety of your equipment, be sure your interrupter switches are HPL-C and operate with TOG-L SNAP mechanisms.

SAFETY FEATURES—(1) HPL-C closes in on special heavy closing contacts, outside the interrupter—thus preventing damage to the interrupter switch when closing in on moderate fault currents; (2) High velocity "OVR-CENTR" blade closing (and opening) with the TOG-L SNAP operating mechanism—an optional feature, providing additional safety, important especially during the closing operation. For safety sake, specify these important features.

TESTS—Actual closing against moderate 3-phase fault currents at 4.8 and 13.8 Kv has proven that the HPL-C offers this protective feature. Ask the I-T-E Representative to give you the complete facts and details. They will show real economies on installation, operation and maintenance.

Supplied by leading electrical equipment assemblers, switchboard builders and transformer manufacturers in switchboards and unit substations.



TOG-L SNAP—The high velocity blade operating mechanism. Optional, and important to safe closing-in operation.

RATINGS—Fused HPL-C Interrupters
Up to 14.4 Kv (110 BIL)
400 Amperes—(40,000 Amp. Mom.)
1200 Amperes—(60,000 Amp. Mom.)

R&IE

R&IE EQUIPMENT DIVISION
I-T-E CIRCUIT BREAKER CO.
GREENSBURG, PA.

HPL-1

ATTENTION MOLINE!

Quad Citian bumps Mr. Entropy* off— stops steam waste with SELECTOTHERM

Around Moline, Frank Tyler, 1824 Third Avenue, is well known for getting rid of steam waste in schools and other buildings where boilers are used for steam heating.

He does it with SELECTOTHERM, the high-vacuum heating system that automatically provides steam at the proper pressure and temperature for perfect comfort. Installation records show that SELECTOTHERM cuts the fuel bill 19% or more—*enough to pay for the system within five years!*

SELECTOTHERM applies the control directly to the boiler, adds to the effectiveness of unit ventilators and individual room control. Get the whole story. If you're from the Quad City area, call Frank at American Air Filter Company, Inc., (4-6815). If not, write for fact-filled SELECTOTHERM booklet, *Boiler Room Ballad.*

**Mr. Entropy represents the heat that is produced but unavailable for use.*

SELECTOTHERM
HEATING CONTROL SYSTEM ®

A product of Illinois Engineering Co.
Division of American Air Filter Co., Inc.
2035 South Racine Ave., Chicago 8, Illinois

County, Pa. $1,000,000. Client, Beall & Perkins, Arch.

Pilot plant, Pittsburgh Plate Glass Co. Research Center, Springdale, Pa. $750,000. Client, Hoffman & Crumpton, Arch.

Day & Zimmermann, Inc.
Philadelphia, Pennsylvania.
25,000-sq-ft addition to manufacturing plant to house offices, manufacturing facilities, and new fabrication shop. $500,000. Client, Schutte and Koerting Co., Cornwells Heights, Pa.

Leonard Shaffer.
Philadelphia, Pennsylvania.
Outgoing shipments building, Philadelphia, Pa. (struc., mech., elec.) $200,000. Client, General Electric.

RHODE ISLAND

Peter A. Mikal.
Providence, Rhode Island.
Advance planning, U.S. Naval Base, Newport, R.I. Fleet training center building, heating, ventilation, air conditioning, and plumbing. (mech.) $500,000. Client, U.S. Navy.

SOUTH DAKOTA

Raymond H. Reed & Company.
Columbus, Nebraska.
235 miles distribution and 32 miles transmission line. (elec.) $380,000. Client, LaCreek Electric Assoc., Martin, S.D.

TENNESSEE

Schmidt Engineering Company.
Chattanooga, Tennessee.
Sewerage for newly annexed areas covering 5200 acres and population of 44,000. $3,000,000 (est.) Client, City of Chattanooga, Tenn.

TEXAS

Frank H. Payne & Associates.
Fort Worth, Texas.
Plans and design of 360-lot subdivision and future shopping center, streets, utilities, and drainage. Fort Worth, Texas. $250,000. Client, Riverside Home Builders, Fort Worth.

Colletti & Ackert, Engineers.
New York, New York.
A&P pilot sulfur plant, United Trading & Development Center, Beaumont, Texas. Engineer, design and detailing, and supervision of construction. (civil, struc., mech., elec.) $35,000. Client, Ackert & Peterson, New York, N.Y.

Charles R. Haile Associates, Inc.
Houston, Texas.
Water system improvement ($300,000) and sewerage system improvement ($300,000), Hitchcock, Texas.

Millwee and Associates.
Bellaire, Texas.
Sewage treatment plant. (civil, struc., mech., elec.) $108,000. Client, City of Liberty, Texas.

Sewage treatment plant. (civil, struc., mech., elec.) $60,000. Client, City of Richmond, Texas.

Sewage collection system and treatment plant. (civil, struc., mech., elec.) $90,000. Client, Sugarland Industries, Inc.

Paving, sanitary sewers, and water lines. (civil, struc., mech., elec.) $600,000. Client, City of Deer Park.

Dunbar & Dickson.
Freeport, Texas.
Waterworks and sanitary sewerage system. $300,000. Client, Wallis.

Kenneth E. Esmond & Associates.
Odessa, Texas.
County highway improvements and extensions, Crane County, Texas. $200,000. Client, Crane County.

Forrest and Cotton.
Dallas, Texas.
Engineering report — 15-year plan—water supply and distribution and sewage collection, plans and specifications. Client, City of Ennis, Texas.

Outfall sewer plans and specifications. $30,000. Client, City of Gladewater, Texas.

Plans and specifications for construction of Cottonwood Branch trunk sewer. $67,000. Client, City of Richardson, Texas.

Engineering report on street and storm sewer improvements. $1,000,000. Client, City of Richardson.

Supervise repair of Runway 17-35, U.S. Naval Air Station, Dallas, Texas. $200,000. Client, U.S. Navy.

Relocate structure and supervise construction of taxiway and apron, Sheppard Air Force Base, Wichita Falls, Texas. $600,000. Client, Corps of Engineers.

VIRGINIA

Kegarise Engineering Co.
Winston-Salem, North Carolina
Furniture factory, 300,000 sq ft, Stanleytown, Va. (civil, struc., mech., elec.) $10,000,000. Client, Stanley Furniture Co., Stanleytown, Va.

Fortune Engineering Associates.
Alexandria, Virginia.
Roanoke-Salem shopping center. Roanoke, Va. (struc.) $3,750,000.

CONSULTING ENGINEERS SPECIFY

SPEEDLINE STAINLESS STEEL FITTINGS

FOR POWER PLANT PIPING SYSTEM

● *Cut Materials and Labor Costs...*

● *Solve Leakage and Corrosion Problems!*

A high degree of water purity is a must for efficient operations at Pennsylvania Electric Company's Shawville Station. Neutralizing and demineralizing a highly acidic water supply demands positive protection from contamination and corrosion. Careful study of all available piping materials led Gilbert Associates, consulting engineers, to specify low cost light wall stainless pipe and Speedline Fittings for *both* boiler feed lines *and* water make-up lines!

Elimination of contamination and corrosion problems plus savings in materials costs, installation time and maintenance-free system performance *proved* the wisdom of the choice. Speedline insert flanges eliminated costly back welding. Exclusive design features of Speedline tees, aligning connectors, reducers and elbows reduced installation time. *Every* joint proved 100% leak-proof!

Three years of trouble-free service has earned for Speedline Fittings the complete satisfaction of Shawville's plant superintendent.

There are other piping design and assembly advantages possible *only* with Speedline Fittings. Get the *complete* facts for your application by writing for a copy of "Speedline Fittings" today. Or discuss your requirements with the Speedline representative nearest you.

700

Speedline®

®REG. TM

STAINLESS STEEL FITTINGS

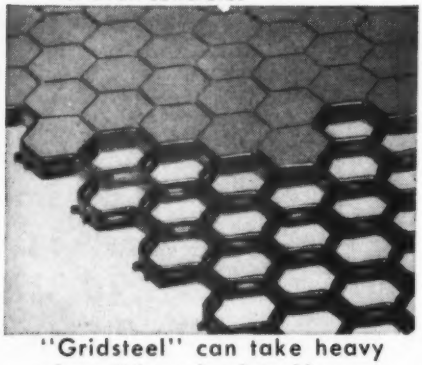
THE NEWEST THING IN PIPELINE ECONOMY

SPEEDLINE DISTRIBUTORS ARE LOCATED IN PRINCIPAL CITIES FROM COAST TO COAST

Manufactured by **HORACE T. POTTS COMPANY** • 522 E. Erie Avenue • Philadelphia 34, Penna.

DO RUTS AND POTHOLES RUIN YOUR PLANT FLOORS?

The small hard wheels of heavy loaded fork lift trucks, hand trucks and impact from heavy falling objects often ruin industrial floors made of wood, asphalt or even concrete.



"Gridsteel" can take heavy abuse. It is made of steel bars on edge, joined together in a hexagonal mesh pattern. Steel takes the wear. No potholes or ruts can form because any crack which might occur in the fill cannot spread beyond the area of a single steel mesh.

Write today for complete information. Ask for catalog on "Gridsteel" floor armor.

★

Manufacturers of Riveted, Welded, Pressure-Locked Gratings in Steel, Aluminum and other metals.

"A Fitting Grating for Every Purpose"

IRVICO

IRVING SUBWAY GRATING CO., Inc.
Originators of the Grating Industry

Offices and Plants at
5056 27th St., LONG ISLAND CITY 1, N. Y.
1856 10th St., OAKLAND 23, CALIFORNIA

Client, Jos. Saunders & Assoc., Alexandria, Va.

City Hall, Falls Church, Va. (struc.) $300,000. Client, Milton Grigg & Assoc., Alexandria, Va.

School for deaf, Staunton, Va. (struc.) $325,000. Client, Jos. Saunders & Assoc., Alexandria, Va.

Plymouth Haven School, Fairfax County, Va. (struc.) $465,000. Client, Bailey & Patton, Arlington, Va.

Chesterbrook Presbyterian Church, Fairfax County, Va. (struc.) $110,000. Client, Jos. Saunders & Assoc., Alexandria, Va.

WASHINGTON

Carey and Kramer, Consulting Engineers.
Seattle, Washington.
Design of shielded personnel monitoring station at Richland, Wash. (civil, struc., mech., elec.) $110,000. Client, Atomic Energy Commission.

H. E. Bovay, Jr., Consulting Engineer.
Spokane, Washington.
Drainage and flood control, Spokane, Wash. $200,000. Client, city and county, Spokane, Wash.

County bridge, Ritzville, Wash. $30,000. Client, Adams County engineer.

County bridge, Davenport. $30,000. Client, Lincoln County engineer.

Two bridges, Spokane, Wash. $100,000. Client, County engineer.

2.5 miles of county road, Republic, Wash. $60,000. Client, Ferry County engineer.

Marshall, Barr & Associates.
Seattle, Washington.
New shipping gallery. (struc., mech. elec.) $250,000. Client, Port of Longview, Wash.

Coal loading facility. (struc., mech., elec.) $125,000. Client, Port of Seattle, Wash.

32-in. blooming mill building. (struc.) $250,000. Client, Bethlehem Pacific Coast Steel.

Soaking pit building. (struc.) $225,000. Client, Bethlehem Pacific Coast Steel.

Harmon, Pray & Detrich, Architects & Engineers.
Seattle, Washington.
Rehabilitation center, Seattle, Wash. $750,000. Client, Department of Labor & Industries, State of Wash.

Administration building addition, Olympia, Wash. $2,000,000. Client, General Services Administration, State of Wash.

PAD-YIM 99A production facility, Seattle, Wash. $925,000. Client, Boeing Airplane Co.

WEST VIRGINIA

Associated Engineers, Inc.
Huntington, West Virginia.
Addition to coal handling and storage facilities. $185,000. Client, United Pocahontas Coal Co.

Coal tipple and storage facilities. $140,000. Client, Crystal Block & Coke Co.

Ralph N. Shepard, Assoc., Irving Bowman & Associates.
Charleston, West Virginia.
Multi-purpose federal building for General Services Administration, Ronceverte, W. Va. $265,000. Client, U. S. Government.

Seventh-day Adventist Church, Charleston, W. Va. $300,000. Client, Seventh-day Adventist Church.

Telephone building, Sutton, W. Va. $100,000. Client, Chesapeake & Potomac Telephone Co. of W. Va.

Radio astronomy observatory, design of roads, site planning, water and sewerage improvement, and buildings and electrical distribution. Green Bank, W. Va. $1,500,000. Client, Associated Universities, Inc. for National Science Foundation.

Lee Street building, Charleston, W. Va. $150,000. Client, Goldfarb.

Telephone exchange building, Williamson, W. Va. $380,000. Client, Chesapeake & Potomac Telephone Co. of West Virginia.

Telephone exchange building, Logan, W. Va. $420,000. Client, Chesapeake & Potomac Telephone Co.

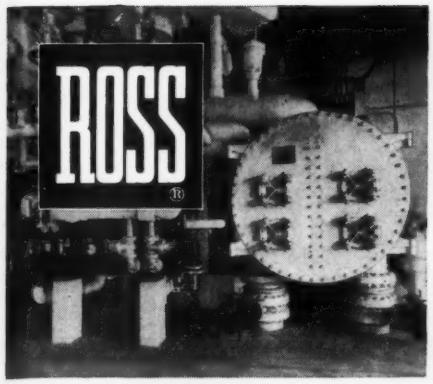
Works laboratory, Building No. 70, 1957 extension. $490,000. Client, Union Carbide Chemicals Co.

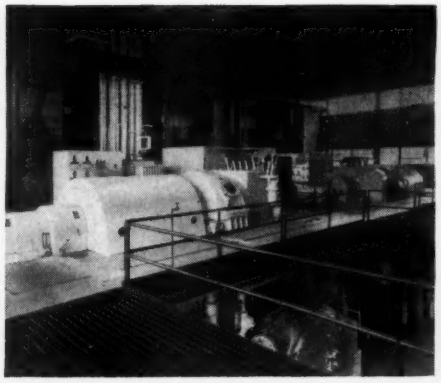
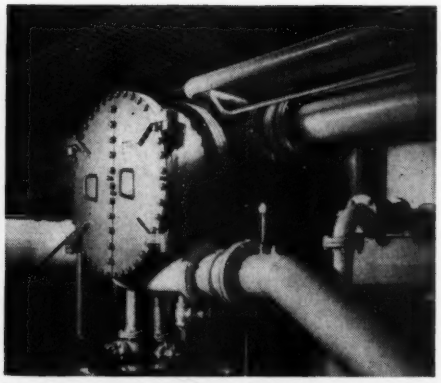
WISCONSIN

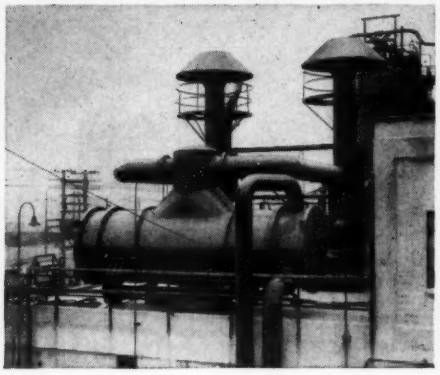
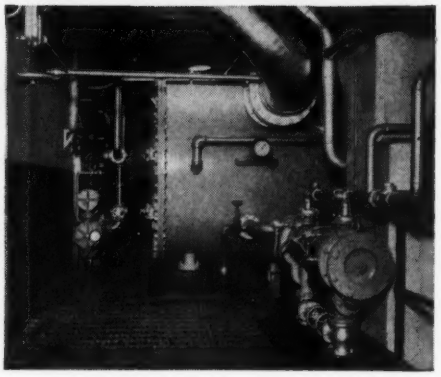
Nielsen and Bruch.
Minneapolis, Minnesota.
Increase capacity of present boiler plant by adding new boiler and complete modernization program of existing equipment. (mech., elec.) $165,000. Client, St. Rose Convent, LaCrosse, Wis.

FOREIGN

Allington Engineers.
Memphis, Tennessee.
Office engineer and director of surveys for Kradji dam project Tehran, Iran. Client, Government of Iran and Harza Engineering Co., Chicago.



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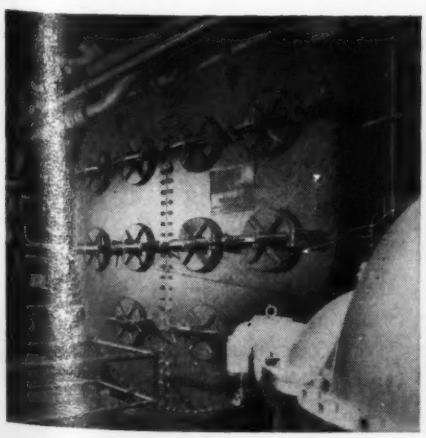
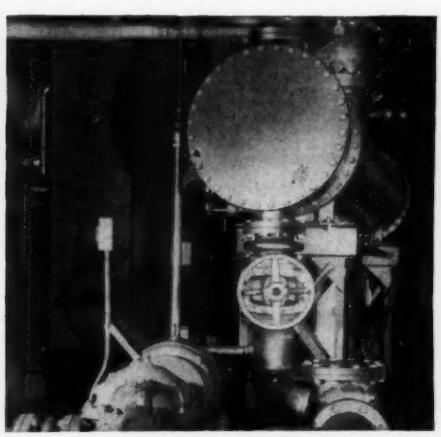
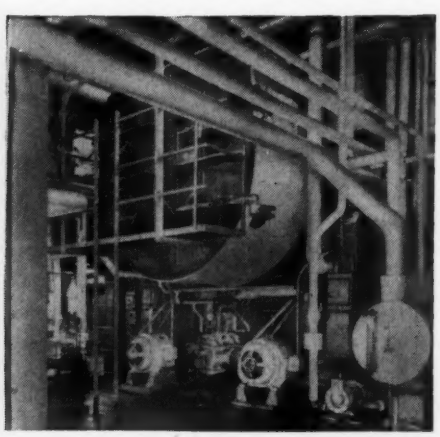

Books

For the Libraries of

Consulting Engineers

HANDBOOK OF STANDARD STRUCTURAL DETAILS FOR BUILDINGS, by Milo S. Ketchum; Prentice-Hall, Inc.; 120 pp.; $4.65.

Reviewed by
James W. Albert
Design Engineer
Eckerlin and Klepper

This book adds another title to the long list bearing the byline of Milo S. Ketchum, but the present volume is the work of the son of the author of the famous *Structural Engineer's Handbook* of a generation ago. The younger Ketchum, after teaching structural engineering at Case Institute of Technology for several years, entered into private practice. He is now a partner of the consulting engineering firm of Ketchum and Konkel, in Denver, Colo. The firm specializes in the design of thin shell concrete structures.

The work was originally intended to serve as an office manual, for instructing the younger engineers in the author's own office, and it proved so successful for that purpose that it has been expanded to the present volume.

It was written with the purpose of supplying information on the preparation of structural working drawings. As such, discussions of structural analysis, design, architectural details, and shop details have been omitted except as they effect the preparation of drawings. The author stresses the importance of the "plan" in any set of drawings and of the value of showing just the right amount of information, not too much and not too little. He points out that sections should be drawn only for areas where the information can not easily be obtained from the "plan" itself.

The information is presented in a unique manner for a book so full of explanatory drawings. The text accompanying each drawing appears on the same page or opposite page. As a result, when reference is made to a drawing, it is right in front of you. This feature makes it very easy to read and study the material.

The book covers the following types of buildings in separate chapters: small house, small masonry building, reinforced concrete building, steel frame building, industrial building, and timber building. For each of these buildings, a typical foundation plan, floor plan, roof plan, along with typical sections pertaining to these plans, are shown. In instances, the individual buildings are presented with different types of foundation conditions, floor framing, and roof framing schemes. This enables the author to present several different types of construction for each building covered. Alternate welded connections are shown for comparison with the typical bolted connections for steel framing.

It clearly shows how much detail is required on a structural drawing so that a contractor can prepare a bid for and build the structure from the drawings. It points out several items that the engineer can expect the contractor to infer from the drawings and some items that the contractor is not expected to infer.

This book should prove very useful for all consulting structural engineer's offices. It should be an extremely helpful book for students and engineers just starting in the building construction field, as it clearly shows how buildings are put together. It should also prove useful to the office wishing to set up standard structural details for their own office use.

It is obvious that structural details will never be completely standardized. However, this book presents many standard details for several types of construction that have been used over the years in many structural design offices. It has been assumed that the reader will have a working knowledge of building construction and will know when these standard details can and cannot be used.

ALSO AVAILABLE

STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS, 9th Ed., edited by Archer E. Knowlton; McGraw-Hill Book Co., Inc.; 2311 pp.; $19.50.

Revised and modernized, this edition has been planned to incorporate important facts and data from all the changes and developments in materials, methods, and applications that have taken place during the eight years since the last edition. It is an encyclopedia of facts and figures, definitions, conversion factors, physical and mathematical principles, formulas, and experimental data.

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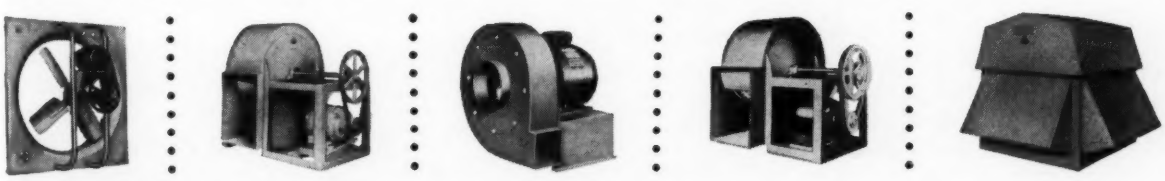

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ELECTRICAL SYSTEMS DESIGN, by Joseph F. McPartland; McGraw-Hill Book Co.; 140 pp.; $6.00.

This book gives a complete picture of modern practice in the design and layout of electrical systems for power, light, heat, signal systems, and communications. It includes circuit controls, wiring sizes, code requirements, voltage ratings, and all the other data necessary for design work.

Step-by-step procedures are shown for selecting designs that will fulfill electrical power requirements; for implementing these designs with actual equipment and hardware; and for incorporating the resulting system within the physical dimensions of a building.

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EXPERIMENTAL BOILING WATER REACTOR, prepared by Argonne National Laboratory; U. S. Atomic Energy Commission; 233 pp. (paperbound); $2.25.

This book was written by the engineers and scientists who designed, built, and placed in operation this first direct-cycle boiling water reactor power plant at Argonne National Laboratory.

It sums up engineering data and other information on the reactor itself, the steam plant, and the auxiliary, instrumentation, control, and generating systems.

The appendix includes: design calculations, boiling density studies, fuel material data, fuel subassembly production, coolant activation and decontamination, pressure vessel and thermal shield design philosophy, explosion containment, shield calculations, plant start-up and planned operation, containment shell pressure strength and leakage-rate results, and vessel support structure design information.

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COMPOSITION AND PROPERTIES OF CONCRETE, by George Earl Troxell and Harmer E. Davis; McGraw-Hill Book Co., Inc.; 434 pp.; $7.75.

Divided into two main parts, the first covers characteristics of cements, aggregates, admixtures, and water used in concrete mixes; the proper proportioning of these materials; and the batching, mixing, placing, and curing of the concrete to produce a finished product of suitable and predictable quality and economy.

Part II comprises instructions for laboratory tests, selected to illustrate the most important facts and principles connected with use of cement, aggregate, and concrete.

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ELEMENTS OF PURE AND APPLIED MATHEMATICS, by Harry Lass; McGraw-Hill Book Co., Inc.; 499 pp.; $7.50.

Containing a more rigorous treatment of individual topics than is found in the majority of applied mathematics texts, this work provides a thorough treatment of the various subjects in classical mathmatics that are most useful to the engineer and physicist.

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NUCLEAR ENGINEERING, edited by Charles F. Bonilla; McGraw-Hill Book Co., Inc.; 850 pp.; $12.50.

Written by twelve experts in various fields of engineering and science, this reference work gives the basic principles of the main engineering disciplines involved in the design of nuclear reactor cores and power plants. In each of the twelve fields, fundamentals are given briefly and clearly, with enough illustrations and advanced specific analyses to make the book valuable to the design engineer.

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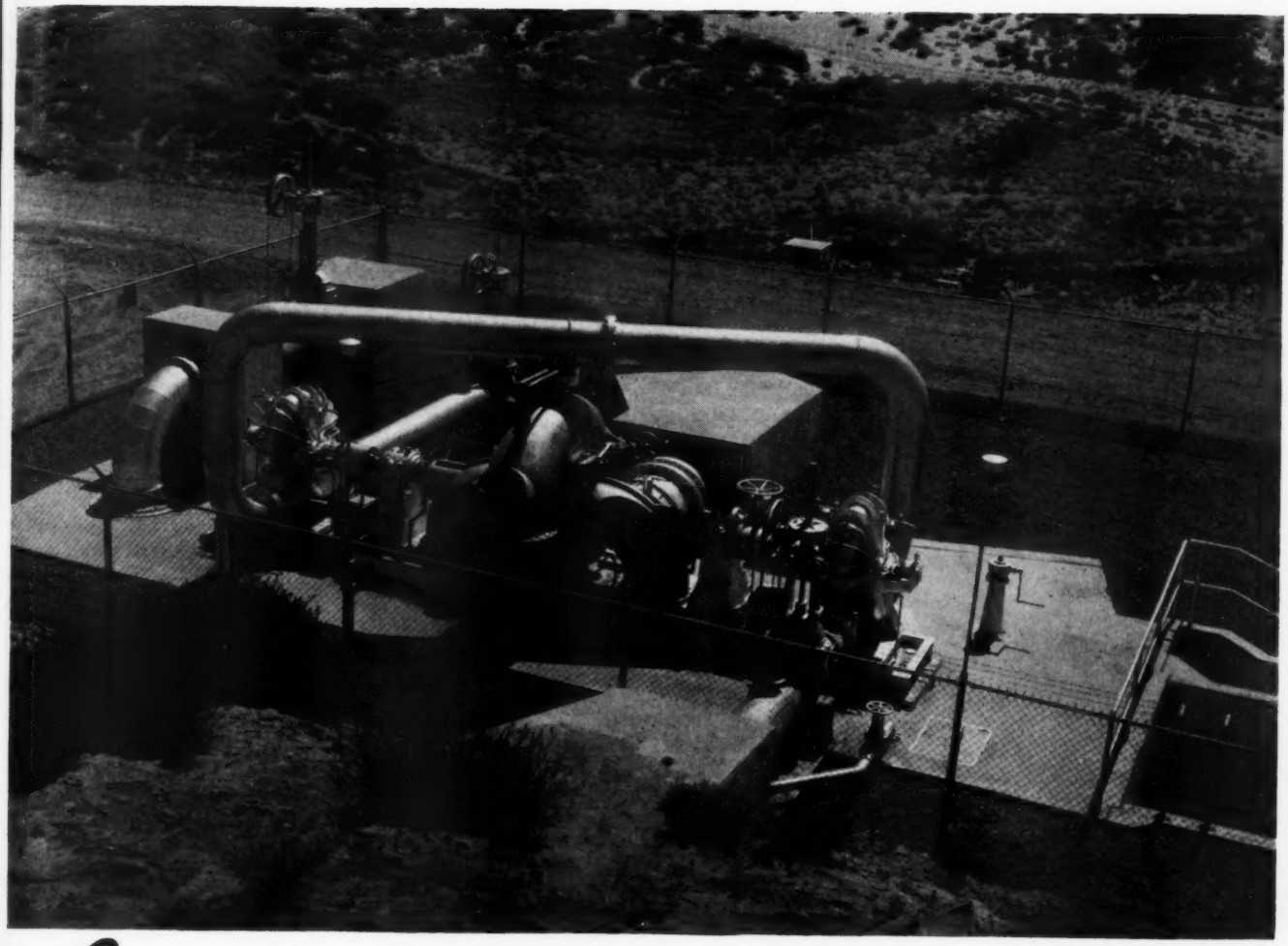
UNIT OPERATIONS OF CHEMICAL ENGINEERING, by Warren L. McCabe and Julian C. Smith; McGraw-Hill Book Co., Inc.; 945 pp.; $10.50.

This volume covers the unit operations of chemical engineering from both a practical and theoretical standpoint. Each unit operation is treated separately. General discussions are included covering fluids mechanics, flow of heat, and mass transfer, each giving scientific and theoretical foundations for several operations. In place of a multiplicity of mass transfer coefficients, only one —



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DIGITAL COMPUTER PROGRAMMING, by Daniel D. McCracken; John Wiley & Sons, Inc.; 253 pp.; $7.75.

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WRITTEN COMMUNICATION IN BUSINESS, by Robert L. Shurter; McGraw-Hill Book Co., Inc.; 490 pp.; $6.00.

An analysis of the most widely used forms of business writing — the letter, the report, and the memorandum — this book begins with a statement of the fundamental principles and goal of written communication and the technique of getting ideas across in writing. These principles are then applied to the specific types of writing used in business. Interspersed throughout the book are various checklists so that the writer can evaluate his own work as he writes.

The material on graphic presentation was written by Kenneth W. Haemer. This special section shows the importance of the use of charts and graphs in the writing of business reports. A handy reference section answers specific questions about grammar, punctuation, spelling, and the mechanics of capitalization and style.

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Values and benefits of properly installed and adequate sanitary sewer systems are described in a new 12-page booklet published by the Clay Products Association under the title "Planning for New Sewers." It outlines all the basic steps necessary in planning and development of domestic and industrial waste facilities, applicable to communities of all sizes. The booklet covers the procedures to be followed from the initial steps in planning adequate sewerage systems through to methods of financing. Free copies are available from the Association at 100 North LaSalle St., Chicago 2, Ill.

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APPLIED STRENGTH OF MATERIALS, by Alfred Jensen; McGraw-Hill Book Co., Inc.; 343 pp.; $5.75.

A companion to the author's *Applied Engineering Mechanics*, this book follows the same simplified mathematical approach, developing all design formulas without the use of calculus. Included are the latest formulas and design procedures for use of timber columns as recommended by the National Lumber Manufacturers Association. The "beam-diagram" method of deriving the deflection formulas for some of the most commonly occurring types of beams and loadings is presented.

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THE 1957 HYDRAULIC HANDBOOK; Fairbanks, Morse & Co.; 251 pp.; $3.50.

Designed to assist you in solving pump application problems, this book is complete with tables, graphs, formulas, and illustrations.

FILMS

"CERAMIC TILE IN MODERN SCHOOL DESIGN," Tile Council of America, Inc., sound and color, 13 min.

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